The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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"Our President"

IN the discussion on the financial report at the Annual Meeting of the Society of Chemical Industry at Newcastle last week, Mr. E. V. Evans, the new treasurer, offered some gently satirical *obiter dicta* which were generally taken to refer to THE CHEMICAL AGE. According to the report supplied by our reporter, Mr. Evans said "he sometimes thought the Society was too lenient in the matter of giving information to contemporary journals—information which really belonged to the Society. One journal claimed the Society as its own, and headed an editorial as 'Our President.'" In addition to our reporter's version, two well-known members of the Society wrote to us mentioning the words "Our President," which they clearly understood Mr. Evans to have used, and other members informed us that the reference was generally taken to apply to THE CHEMICAL AGE. As no editorial note headed "Our President" had ever appeared in this journal, and as the proprietory attitude attributed to us depended obviously on the word "our," we wrote Mr. Evans on the subject in the following terms:—

> Several members of the Conference who heard your remarks about a certain journal write to us that they obviously referred to THE CHEMICAL AGE, and your reference has generally been taken in this sense. Would it be too much to ask you kindly to say whether THE CHEMICAL AGE is the journal you referred to, and, if so, what issue of THE CHEMICAL AGE it was in which the editorial note headed "Our President" appeared?
>
> Our relations with the Society and all its officials have been so pleasant that we should not care to have them influenced by a misunderstanding.

Replying to our inquiry, Mr. Evans writes:—

> In the first place, I am pleased to confirm your statement, as far as my experience goes, that the relations between THE CHEMICAL AGE and the Society of Chemical Industry are always most pleasant.
>
> I think you should know what I actually said at the annual meeting on Tuesday last: "I would further point out that certain chemical journals use matter which is the property of your Society to a much fuller extent than should be allowed. One contemporary, who shall remain unnamed, even adopts this Society as its own, in that I find its leading articles are headed 'The Annual Meeting,' 'The New President,' &c. I must admit that they have said some very nice things about the Society, and I welcome the opportunity of publicly thanking them."
>
> I hope that this deals with the question raised in your letter.

This does, indeed, deal with the question, but rather indirectly. The first point is that our reporter, like the two members who quite independently communicated with us, has attributed to Mr. Evans a phrase he never used, and the particular word on which his argument rested. This, however, may be left for some journalistic court of appeal to settle. Then, again, the inaccurate version at least did make sense. If we had used the title "Our President," an adept at leg-pulling might properly have poked fun at our paternal interest in the Society; but, frankly, we fail to see how the headings "The Annual Meeting" and "The New President" in any way support Mr. Evans's suggestion that we had claimed the Society as our own. Analogous reasoning in other cases would produce curious results. When *The Times* speaks of "The New Government," that implies that it owns the Government. When *The Church Times* refers to "The New Pope" (no pun intended), it claims the ownership of the Vatican. Or when *Nature* describes to us "The New Comet" it is posing as the ground landlord, to whom applications for building sites must be made. It all seems a little confusing.

The Important Issue

THIS incident in itself is of little importance, except as tending to enliven the solemnity of a scientific gathering. But behind some of Mr. Evans's remarks lies an issue of fundamental importance,—a choice between two entirely different conceptions of the Society's place and functions. Let us recall the objects of the Society.

The first is "to promote and advance applied chemistry and chemical engineering." It was established to advance, not a society, but a science; the Society was to be, not the end, but the means to an end. The distinction needs to be kept in mind.

The second purpose is "to afford opportunities for the interchange of ideas with respect to improvements in the chemical industries and all matters bearing upon the applications of chemical science." Its aim was not to isolate ideas in watertight compartments, but to disseminate them as widely as possible; not to intern knowledge, but to liberate it; not to limit the applications of chemical science, but to extend them for the benefit of mankind.

Thirdly, it was established "for the publication of information connected with the subject,"—for the publication, it should be noted, not to restrict the publication of information, on the principle that progress depends on knowledge, and that by the spread of knowledge the ultimate aims of the Society might be the sooner attained.

Now, let us see how the theory of Mr. Evans and those who think with him squares with these ideals. Take, as an example, the phrase "certain chemical journals use matter which is the property of the Society to a much fuller extent than should be allowed." We know what the speaker has in mind. All through the autumn and spring lectures and papers are arranged for that "interchange of ideas" which the Society's founders contemplated, and instead of making that interchange as wide and beneficial as possible, Mr. Evans's policy is further to restrict it. While the universities send out their extension lecturers to reach the masses who cannot go into residence, the Society of Chemical Industry, we are told, must keep the knowledge which is its property as much as possible to itself. So by degrees a society formed for the diffusion of scientific truth is converted into one for restricting it. The means to an end supersedes the end itself.

What can a great body like the Society of Chemical Industry gain from such a reactionary policy? If it secured any material gain, it would be at the cost of sacrificing the trust with which its founders charged it of seeking supremely the promotion and advancement of chemical science. The best balance-sheet ever produced could not compensate for such a default. Such a Society is best serving itself—though one needs some imagination to see it—when it serves disinterestedly the cause which brought it into being, and its best friends, we hope, will see that the high ideals of its founders are neither lowered nor narrowed.

We have dealt with this question with some frankness because in our view the problem whether the Society is to develop along national and public lines or is to be restricted into a sort of private monastic order is vital to its own future. Mr. Evans, we are sure, will recognise that he is only introduced into the discussion as the spokesman of a policy, and our belief that that policy is bad for the Society in no way diminishes our sense of the value, sincerity and distinction of his own work. Our columns are freely open to those who have views on this subject.

Interim Report on Power Alcohol

IT is now well over a year since the first comprehensive Report on power alcohol was issued by a special Committee of the Fuel Research Board. The recommendations and suggestions then made were necessarily of a preliminary nature, but resulted in the establishment of a small permanent organisation, upon which has devolved the task of attempting to solve the many intricate considerations attending the production of fuel alcohol. In December of last year Sir Frederic Nathan was appointed Power Alcohol Investigation Officer, and he has now issued a memorandum setting forth the present position. So far as petrol is concerned, it has for long been obvious that the supply cannot keep pace with the demand, and the recent decision as to railway fares in this country is almost sure to aggravate the shortage seriously. Whereas before the war about 100 million gallons of motor spirit were used annually, consumption in 1919 rose to 200 million gallons, and for 1920 it is estimated at 250 million. During 1921, however, an enormous increase in the output of motor vehicles is inevitable; and, with so many factors tending to divert traffic from the railways to the roads, it will be a matter for surprise if a year hence the demand does not approximate to some 350 million gallons per annum. The present position is particularly unsatisfactory for the liquid fuel consumer. At the moment he has practically no alternative; home-produced benzol prospects are disappointing by reason of the small output, English petroleum products never seem to reach a serious stage of production, and the outlook for alcohol—the one remaining hope—is not exactly encouraging so far as the near future is concerned.

To consider home resources of raw material for alcohol manufacture, it is well known, of course, that the three vegetable products to which we can turn are potatoes, mangolds and barley. To provide for the whole of our present consumption of liquid fuel it would require annually about 4 million tons of barley, 12½ million tons of potatoes, or 25 million tons of mangolds. Against this has to be put the fact that in 1919 our total production of barley amounted to only about 30 per cent. of the above-named quantity, that of potatoes 50 per cent., the output of mangold being about a third of the total required for spirit alone. This, therefore, leads to the one conclusion that the production of alcohol in the United Kingdom in any considerable quantities is not economically possible. During the war we learnt to the full the necessity of becoming self-supporting in the way of foodstuffs. This is a consummation which in itself is scarcely likely to be realised, and to deprive ourselves of potential feeding capacity for the sake of procuring a

special form of fuel would be a blunder of the most elementary nature.

If success is to be achieved, it lies, perhaps, with the Dominions and the tropics to provide the necessary acreage for the cultivation of raw vegetable products. Climatic conditions enter largely into the reckoning, and a further source—namely, molasses—then presents itself. One cannot, however, have molasses without having sugar as well, and in order to produce sufficient spirit in this way it would be necessary to flood the markets of the world with some 14 million tons of sugar per annum above that which is now required. Again, the question of plant would be stupendous, and, if the raw material were to be imported and worked up over here, it would mean that existing apparatus would have to be increased thirty-fold in order to meet fully the demands. The natural gift to which this country owes its commercial supremacy is coal; and from whichever standpoint the fuel position is viewed it would seem that, in spite of alternatives which to the uninitiated may seem full of promise, we can take no other course than that of developing to the full the products of the one raw material with which we have been endowed in plenty.

The Research Chemist's Opportunity

RESEARCH in all branches of industry has of late years become both more extended and more intensified, and the new results must from time to time be put on permanent record and in easily accessible form for the use of students, practising chemists, engineers, and others; but, as all concerned in such matters know, the prices of paper, printing, illustrations, binding, and distribution have risen far beyond all previous standards, and the issue of a new work—however important it may be—though it might have been lightly undertaken in ordinary times, is now a matter of some risk.

Already in connection with their journals, *The Electrician*, *The Gas World*, *Aeronautics*, *The Fruit-Grower* and others, Benn Brothers, Limited, have published text books which are recognised throughout the world as standard works on the subjects treated. In connection with chemistry and its industrial applications, there is an enormous field still uncovered for enterprise in this direction, and the publishers of THE CHEMICAL AGE contemplate a similar series of text books on chemical science and engineering, being well qualified by their previous experience and extensive trade connections to undertake not only the printing of text books in excellent style, but what is equally important, their wide advertisement, distribution and sale.

It is clear from the correspondence which reaches us that many men engaged in research work have thoughts of publishing the results, but know little of the practical details of technical publication. In many cases, no doubt, the experienced judgment of the expert in such matters would be against publication, for it is an inevitable weakness of authors to take too optimistic estimates of the demand for their writings. On the other hand, matter which might very well justify publication may be lying unknown on account of the author's modesty or inexperience. An arrangement with a reputable technical journal for serial publication of such work first, followed by the issue later of the revised text in volume form, is often a great convenience to the author. In the first place it is usually economical, a point of some importance to-day. Then it allows of preliminary treatment and criticism of the matter before issue in its final form, thus protecting the author against little inaccuracies and oversights that must otherwise occur. Finally, it gives time and opportunity for arranging the matter roughly into sections and for deciding ultimately on the best order and scale of treatment.

Our publication manager is always ready to consider suggestions from authors, especially the younger generation with the new and valuable experience acquired during the War years, for the publication of works dealing with chemistry in its pure, applied, or engineering aspects, as well as with civil or mechanical engineering, aeronautics, and similar technical subjects. Correspondence on these matters may be addressed to him care of THE CHEMICAL AGE, Book Department, 8, Bouverie Street, E.C. 4.

Physics and Chemistry of Colloids

WE are glad to hear that the Faraday Society and the Physical Society of London are arranging to have a joint symposium and general discussion on the important subject of "The Physics and Chemistry of Colloids and their Bearing on Industrial questions" next October. The subject will be introduced by a brief survey of the present position of colloidal physics and chemistry, and discussion will then follow on the following sub-divisions of the subject: Emulsions and Emulsification; Physical Properties of Elastic Gels; Cataphoresis and Electro-endosmose; Precipitation in Disperse Systems; Glass and Pyrosols; Non-Aqueous Systems. In spite of the importance of colloidal physics and chemistry in many branches of manufacture, and of the interest which the subject has aroused in recent years, much light remains to be thrown on the nature of the manufacturing process in which colloids play a part. It is hoped that the discussion will focus attention on some of these problems, and that its result will be to indicate lines of advance and suggest further researches, and that it will be fruitful, not only in helping to a fuller understanding of the laws of the colloidal state, but also in suggesting new applications for colloids in the laboratory and in the works.

The exact date and place of meeting and further particulars will be announced later. In the meantime, anyone desirous of using the opportunity of the discussion to bring forward experimental matter or theoretical considerations bearing on the above-mentioned branches of the subject, is asked to communicate as soon as possible with the secretary of the Joint Committee, Mr. F. S. Spiers, 10, Essex Street, London, W.C.2.

Newcastle Conference Group

THE excellent photograph reproduced this week, as a supplement to THE CHEMICAL AGE, of the delegates attending the annual meeting of the Society of Chemical Industry is by Messrs. Stuart, Blackett Street, Newcastle-on-Tyne. Copies may be obtained from Messrs. Stuart for 7s. post paid.

Society of Chemical Industry

Concluding Reports of the Annual Meeting at Newcastle

We give below the concluding report of the proceedings at the Annual Meeting of the Society of Chemical Industry at Newcastle last week, including the remaining papers read at the Conference of the Chemical Engineering Group, the Annual Dinner, Visits to Works, and the Chemical Exhibition.

The Design of Mechanical Filters

MR. BALFOUR BRAMWELL, in his paper on the "Design of Mechanical Filters," read before the Chemical Engineering Group on Wednesday, July 14, said that the principal difference in filtration between the slow sand bed filter and the mechanical filter is in the speed of filtering. In the mechanical filter this speed is approximately 40 times that of the slow sand bed, consequently the mechanical filters are often termed rapid filters to distinguish them from slow sand beds.

The usual speed of filtration for slow sand beds is approximately 2½ gallons per sq. ft. of superficial area, whereas the most economical and satisfactory speed for design of mechanical rapid filters is 100 gallons per sq. ft. when dealing with the purification of ordinary average waters met with. With a better class of water this speed can be increased 20 per cent., and it is not uncommon, but cannot be recommended, to find filters that are being cleansed every six hours working at a speed of 140 gallons per sq. ft.

At every periodic cleansing of a mechanical filter the whole bed should be disturbed and uniformly agitated and cleansed from top to bottom. This is carried out in practically every case by a voluminous reverse flow of water which lifts and eases the bed when the various agitating devices can be put into action. There is really only one filter in existence in which the breaking up of the whole bed is accomplished by other means than these, and that filter is on the "turn-over" principle. In it the whole chamber is made to revolve slowly, like a sand or ore washer or any common revolving washing machine. In the "turn-over" filter, by revolving the whole of the filter chamber to upset the whole filtering material only a comparatively slight reverse flow of water is necessary to wash the impurities to the surface of the bed. In all filters which depend on a voluminous reverse flow of water to lift and ease the filter bed, nozzles and restricted openings are required to concentrate and give force to the reverse flow of water. These restricted openings have a tendency to fur up and clog, and they tend to increase the loss of head in the filter. With the "turn-over" principle there are no nozzles at all in the bottom of the filter. The bed rests merely on a double thickness of perforated plates with holes superposing, having sandwiched in between them a fine mesh of strong copper or bronze gauze. The area, therefore, through the bottom is nearly equal to the area through the perforated plates, and is very large. The gauze is well supported, and only exposed in the perforations, which are half an inch diameter. There is, therefore, no restriction to the passage of water, and practically no loss of head from this cause.

In rapid filters using chemical coagulant treatment the minimum depth of bed of one grade should not be less in the smallest sizes than 2 ft., and in large waterworks filters it should be from 2 ft. 6 in. to 3 ft.

The best filtering material is undoubtedly crushed quartz, because it is hard and sharp and less liable to trituration, and is practically non-absorbent. Natural sand gives the same filtering efficiency, but it does not clean quite so well owing to its rounded particles, neither does it pack so well. It is absorbent, and most of it is composed of a soft, triturable material. Quartz is, however, very expensive and difficult to procure at the present time. The bed in the "turn-over" filter is as nearly as it is practicable to supply one uniform grade throughout. What fine particles, however, are in the bed, by the system of rotating the chamber first in one direction and then in another, have a tendency to find their way to the bottom of the bed and the coarser particles to the surface, just exactly the same effect as the riddling of sand in an ordinary riddle.

The sides of the chamber in the "turn-over" filter are curved or spherical, and have the same beneficial packing effect that cone sides have. There are no internal nozzles in the "turn-over" filter, and no working parts for the cleansing process inside the filter. All working parts are therefore easily lubricated and kept in order, which means a saving in upkeep cost. The smaller sizes of the "turn-over" filter can be easily revolved for cleansing by hand. The power required for other sizes from 5 ft. up to the largest 8 ft. by 21 ft. varies from 1 to 10 electrical horse power. Somewhat larger power must be allowed for if a gas or oil engine is used.

There is practically no loss of filtering material in the cleansing of the "turn-over" filter, because, unlike other filters in which the wash-water is being discharged at the same time as it is being allowed to flow into the filter chamber, the filter is specially arranged so that it is impossible to inject and eject the wash-water from the chamber at the same time. By this arrangement it is possible to place the discharge opening for the dirty wash-water close down to the surface of the bed, and, therefore, get rid of the dirt more thoroughly and rapidly by syphoning action.

For these reasons it is obvious that the cleansing and getting rid of the dirt is obtained with less expenditure of wash-water. It is also claimed that the cleansing of the bed is very much more thorough with the "turn-over" system than with others, and, above all, absolute uniformity of cleansing is secured.

There are two systems of adding chemical solutions into the water to be treated, either by open nozzles by gravity, or injection by means of small pumps under pressure. There can be no question as to the preference of these two systems, for the open nozzle system has very great advantages.

The advantage of allowing proper time for the chemical action and coagulation cannot be overrated. In dealing with river waters, which are always subject to turbidity, when there is no storage provided it is almost without exception more economical to provide for primary sedimentation, and thereby relieve the filters of a large amount of the roughing work which can be done more cheaply by a few hours' sedimentation.

In such cases the open nozzle system of treating can easily be applied. There are, however, some waters, especially those highly peat stained which may have been passed through a reservoir and by sedimentation the large suspended matter got rid of, the subsequent treatment of which requires a comparatively large amount of coagulant to get rid of the peat colour, where primary sedimentation, giving four to six hours, or even up to eight for coagulation and sedimentation, is in the author's opinion practically a *sine qua non*. The providing of sufficient time for the chemical action and sedimentation always means a saving of coagulant and a much more regular result, and where large amounts of coagulant are required, costing large sums annually, provision for proper time for chemical action and coagulation means a great source of economy. The open nozzle system of treating is also much simpler and easier to regulate and keep in order and more accurate in proportioning the treatment. Wherever, therefore, this system can be applied it is an advantage.

There was no discussion, but a hearty vote of thanks was accorded the author.

Recessed Plate and Plate and Frame Filter Presses

MR. EUSTACE A. ALLIOTT, B.Sc. (Eng.), A.M.I.Mech. E., dealing with the construction and use of recessed plate and plate and frame filter presses said the forms of press in general use, namely, the recessed plate type, and the plate and frame type, are often referred to as chamber presses and frame presses respectively. In the former type the rims are raised, so that when two plates are brought together edge to edge a hollow chamber is formed between them. The feed passage

is taken through the body of the plate, while the filter cloths are laid over each side of the plate, forming a pressure-tight joint at the rims when clamped up, and having holes for the feed passage, which are sewn together or clipped to make a joint at the corresponding hole in the plate. This type of press has the merit of being the least expensive, and requiring less labour. It is very suitable for thin cakes, owing to the free communication of the feed passage with the chambers. The usual cake thicknesses are 1 in. on the smaller sizes, 1½ in. on the intermediate and large, and up to 2 in. on the largest plates. It is not generally desirable to use recessed plates for thicker cakes than these on account of the strain on the cloth imposed by the raised rim.

The plate and frame type of press is suitable where very thick cakes are to be formed, as in this case the plates themselves are flat, and the chamber is formed by hollow frames being placed between them. This type of press is also suitable for materials which tend to rot the cloths, as the latter lie quite flat on the plate; it is a necessity if filter paper is to be employed.

Press plates are usually made in cast iron for neutral or alkaline materials, or in wood for acid liquors, or for dealing with such materials as colours, which might be spoilt by contact with iron. Plates, however, can easily be made in bronze or aluminium, or may be covered with hard lead or vulcanite. In the latter case the vulcanite is usually supported by thin steel sheets and the joint surfaces made of softer rubber. Such a press will deal with strong hydrochloric acid.

There are various types of filter surface, ranging from very fine straight grooves to comparatively coarse pyramids or lozenges. The first and most important point is that the channels should be sufficiently deep and narrow not to be closed by the sag of the cloth. In the second place the cloth must be adequately supported with a minimum amount of dead space, though, providing the channels are free, the percentage of dead space within reasonable limits seems to make no appreciable difference in practice. Finally, smoothness and absence of sharp corners is a factor of no little importance. Covering the surface with perforated plates is only to be recommended in special cases where the adequate supporting of the cloth has to take precedence over every other consideration. The design of handles requires more care than is often given. There should be ample room to get the hand in easily without any trapping or fouling. For feeding the press and for washing purposes cocks are better than the ordinary type of valve.

Where quantities of non-viscous liquor containing very small amounts of very fine matter in suspension are to be filtered, special presses are in use. The plates are not provided with a filtering surface of the usual type, but are filled with cakes of finely divided cotton pulp or other suitable material. Such a press would filter at the rate of about 4 gallons per sq. ft. per hour, and when it became clogged the pulp would be knocked out of the chambers, washed in a special washing machine, and then pressed firmly into position again by means of a special hydraulic or screw press.

In recessed plate presses double filter cloths are often used. These cloths are stitched together at the edges of the feed opening, and one cloth is passed through the feed-hole in the plate, both halves being then spread over the filter surface and fastened at the top by clips or pins, or they may be stitched. In such cases the top of the plate carries a projection or fin for convenience in fastening the cloth. This method of fixing is suitable for most purposes, but is strongly recommended where cloths are thin or have often to be taken off and washed. For certainty in obtaining clear filtrates with fine precipitates there is nothing to equal cloths with sewn openings.

In frame presses cloths of double length may be hung over the plate without any special attachment or stitching. It is best to sew them on if there are many passages in the plate rim and the cloth has to remain for some time. Another method is to use single cloths, caught by clips or pins at the top of the plate. The cloth top is sometimes eyeletted and engages with hooks of adjustable height. This permits ease in fixing when replacements are frequent, but sewing is the best if well done.

In dealing with caustic soda, about 5 per cent. free alkali is as much as a cotton cloth will stand to give a reasonable life in ordinary types of press. Somewhat stronger liquors may be filtered if the cloth is treated with heavy naphtha or green oil, especially if care is taken not to allow the caustic liquor to dry into the cloths. In one case which came under the author's notice good results were reported consequent on the removal and soaking of the cloths every week-end. This was additional to the use of an oil preservative. Some users report having employed twill cloths with 10 per cent. free alkali, the life being about three weeks, but it is desirable, if possible, to keep to 3 per cent. or 4 per cent. A similar percentage of sulphuric acid should be satisfactory, though some users report that cotton cloths withstand 7 per cent. to 8 per cent. economically. Twill cloths are perhaps in greater favour than the chain weave, though some users say the latter are stronger and give finer filtration. As far as the author can judge there is not much difference between the two, providing the cloths are properly woven. The mercerising effect of alkali should not be forgotten, and if a cloth is to be used for alkaline liquors, it is best not too finely woven, as otherwise it may become relatively impervious. Further, for corrosive liquors those with the thicker threads seem to give the best results, as they will hold together in the press even after they have become quite rotten when handled. Linen is employed for the more open-mesh straining cloths, which are sometimes useful in the filter press when dealing with comparatively coarse suspensions in liquors containing casein or other substances, which would rapidly render a more compact cloth impervious. Jute and hessian cloths or sacking are often used instead of cotton, and are quite good with weak alkaline liquors, providing a very fine tight weave is not requisite. These cloths are also used as under-cloths, a strong coarse cloth being used to support a thin, tightly woven twill. This helps to protect it from damage at the joints, especially where there is likely to be trouble with rusting.

For strongly acid liquors there are a variety of cloths to choose from. One firm reports that camel's hair is satisfactory up to 30 per cent. sulphuric acid and 10 per cent. hydrochloric acid, while horsehair would stand 10 per cent. hydrochloric acid, but is not good for sulphuric acid. The same firm have used woven copper wire for 12 per cent. to 14 per cent. hydrochloric acid with a life of 4½ months, while the same wire cloth was satisfactory with 30 per cent. sulphuric acid. Wool or felt cloths will generally resist from 15 per cent. to 20 per cent. sulphuric acid, but are of little use for hydrochloric acid. Asbestos will withstand any strength of acid or alkali likely to be put into a filter press, but is apt not to resist handling, and, further, is difficult to obtain in a sufficiently finely woven form. The qualities vary a great deal, and it is well to make careful tests before buying in quantity. On the whole, for strong acids, a good camel's hair cloth, if treated properly, has much to recommend it. A great deal, however, is sold as camel's hair which is of quite other origin.

With regard to wire cloth, in one case which came under the author's notice a twill nickel cloth was used for removing sodium sulphite from mother liquor up to 50 per cent causticity.

Cloths should not be allowed to dry on the press when out of use, but should be rinsed free of corrosive liquors and retained solids, and kept moist.

Washing can be carried out with great advantage in the filter press. The simplest method is to force water in, through the feed passage. This is best done in the plate and frame type, and it is preferable that a solid cake should not be formed, but that a space should be left between the layers built up on each side. Here a bottom feed is advantageous, as the strong liquor can be drained from the chambers prior to washing, though in the ordinary type it can generally be removed by air pressure. It is possible to wash this way in any plate and frame press or even in recessed presses, although they may not have been specially designed for the purpose. If a solid cake is not formed it is the only practicable way except re-lixiviation.

The trouble is that owing to sedimentation the cake is apt to be thicker at the bottom, and in order to keep the two sides from touching space may be wasted at the top. Further, the press capacity is diminished and more labour is necessary in emptying. In some cases, however, solid cakes can be rough washed if they are sufficiently permeable. General reports from users appear to show that more wash water is requisite, but this would depend very much upon the manner of the operation. This method of washing is usually referred to as "simple" washing. Another consists in forcing the water from one side of the cake to the other, and may be referred to as "through" washing.

Viscosity is an important factor, as the rate of flow varies in inverse ratio. Since small increases in temperature may reduce viscosity in much greater proportion, the wise user will not overlook this means of increasing output. If the rate of flow is fairly large, the liquor itself will usually keep the press sufficiently hot. A steam valve is often fixed on the feed inlet, and this may be employed to pre-heat the press. It is also a very useful adjunct for steaming the cake and cloths through at intervals to keep them warm and render them more permeable, as in the case of wool grease recovery. In dealing with cakes of fuller's earth from the refining of lard, oils, &c., it is usual to steam these well through at the conclusion of filtration. This is best done one chamber at a time to concentrate the effect. After such treatment the cakes will usually drop out in the form of a loose meal, practically dry to the touch. They would then contain, say, 14 per cent. of lard. When filtration is slow the press may require special heating arrangements.

In order to get drier cakes air may be blown through the feed passage or from one side of the cake to the other, using the wash passages, in which case it is better to take in the air at the top of the press and bring it out at the bottom, so as to allow of thorough draining.

Labour costs, Mr. Alliott said, are dependent upon the press itself, the general arrangement of the plant, the grade of material, and local conditions.

Discussion

Dr. J. H. HINCHLEY expressed the hope that written contributions on this paper would be sent by those with experience, in order to make it a standard work on the filtration press in this country. It was a paper which the Chemical Engineering Group could be proud of, and he hoped it would stimulate others to bring forward similar papers on other subjects. With regard to washing he would like to know whether when the washing took place in the reverse direction in the cake to that in which filtration took place any disturbing influence had been found in the washing or any irregularity in the cake.

Mr. ALLIOTT said he had found no special difficulty in regard to reverse washing, but it would depend somewhat on the type of cake.

Kelly and Sweetland Filters

Mr. CAMPBELL, of the United Filter Corporation, U.S.A., at this point gave a demonstration with models and a brief description of the Kelly and Sweetland filters.

On the motion of Mr. J. A. Reavell, Chairman of the Group, a vote of thanks was accorded M. Kestner for presiding at the meeting.

Mr. Talbot's Work for the Group

Professor J. H. HINCHLEY proposed a vote of thanks to the Hon. Secretary, Mr. H. Talbot. It was due to him, said Professor Hinchley, that the Chemical Engineering Group had been the success it had been. No one could imagine the amount of work which the Hon. Secretary put into the group. It had been, as a matter of fact, two or three days a week for the past two years, and Mr. Talbot did not spare himself either. In doing this work Mr. Talbot had to face a great deal of difficulty, and he had not the slightest doubt that the members of the Society of Chemical Industry were acquainted with what he meant. Instead of having a separate society they had set to work to form the best educational body which would be most useful to the majority of works chemists, and they decided that it would be better to be a group of the Society of Chemical Industry than a separate society. They had hoped that this would be the beginning of the formation of subject groups in the society, and that the evolution of the society would tend in the direction of subject groups for the industrial side, as well as in local sections. Personally, he believed that idea would succeed as soon as the Chemical Engineering Group had shown how it could be done. It was to Mr. Talbot more than any one else that the Chemical Engineering Group had shown it could be done, and they must back him up in every possible way in the work he was doing by voting for members of the Chemical Engineering Group, and supporting them in the Council of the Society, so that this new phase of evolution of the Society should have full rein and a chance of a successful issue. The group had brought to the front many capable men who would never have been heard of otherwise, and it was these men who could do the most useful work for the group and the society. The policy in the past had been to select well-known people, often an ornamental name, to do certain work for the society, but he believed the work would be much better done by men perhaps not so well known but with a real inside knowledge of the work in question. The paper by Mr. Alliott was a case in point, and who would have heard of Mr. Alliott or Mr. Talbot but for the Chemical Engineering Group. There were a large number of similar men throughout the country, and they had got to be found and to help in the development of civilisation and the chemical industry.

Mr. TALBOT, acknowledging the vote of thanks, said that had it not been for the help and assistance of Dr. Hinchley and others he would have been tempted to give up the work in face of the discouragement he had received during the past two years. Such conferences as these, however, gave him ample reward for his work.

An informal luncheon of the Chemical Engineering Group was subsequently held, the attendance being about 70. The principal guest was M. Paul Kestner, and in the course of his reply to the toast, proposed by Mr. J. A. Reavell, Mr. Kestner dwelt at some length upon the troubles of the inventor, and urged formation of a union of inventors in this country, similar to that which has recently been formed in France.

The Annual Dinner

In the absence of the President (Mr. John Gray), Professor Henry Louis presided over the annual dinner of the Society in the King's Hall, Armstrong College, Newcastle-on-Tyne, on Wednesday evening. There were about 200 members and guests present. The chairman was supported by the Lord Mayor of Newcastle (Councillor Walter Lee) and the Lady Mayoress.

"Society of Chemical Industry"

Mr. FRANCIS PRIESTMAN, chairman of the Ashington Coal Co., Ltd., proposed the toast of the Society of Chemical Industry. Referring to the last visit of the Society in 1908, he said that on that occasion he had had the pleasure of conducting some of the members round the industrial concerns with which he was connected, and on this occasion he hoped to do so again, when they would see many improvements and developments largely due to the work of such people as the Society represented. As a commercial man he appreciated the great work of the industrial chemist in the matter of fuel economy. So far as the by-product industry was concerned they had, before the war, been very largely dependent on the Germans. Since then they had confided themselves to the British chemists and he was glad to say that the confidence had resulted in as good and even better work. He recalled how a famous German scientist had predicted that they would be unable to carry on without them, but they had been able to do so and very successfully. The Society had done a great deal of valuable work since its inception, not only in the matter of research, but in bringing together people interested in the work. That could not but be beneficial to the nation. The great industry in which he was interested—the coal trade—was passing through difficult times and he sometimes thought it might be taken out of their hands. It might be that such men as themselves might be called on to save that key industry. He coupled the names of Mr. John Gray and Professor H. Louis with the toast.

Professor Henry Louis' Reply

Professor LOUIS, replying to the toast in a witty and interesting speech, referred to the circumstances which had led him to make that reply for three years in succession. He was a substitute because their President was not present owing to illness brought on by his tremendous exertions on behalf of the nation during the war. Many of them knew of the great part he had played in the production of chemicals during the war. "His name is not widely known," said Professor Louis, "as he is one of those who worked quietly, steadily and unostentatiously during the war, but, without him and men like him, the country would have been in a sorry pass to-day." (Applause.)

Dealing with the growing recognition of the chemist by the public, Professor Louis said it was undoubtedly due to the war that the British public had discovered that the chemist was not simply a man who kept a shop exhibiting a row of coloured bottles and who sold patent medicines. The academic chemist had been introduced to industrial work with great results. "They have succeeded in bridging the gulf between

abyssmal ignorance on the one hand and esoteric erudition on the other," declared the chairman. Yet the teachers of science did not appear to have obtained that recognition from the nation that they were entitled to. Probably no class had received less from the State. He could wish that the Government was more alive to the importance of fostering the scientific life of the community. It was obvious that so long as the purse-strings of the nation were held by politicians there would be little improvement. The politician and the scientist had little in common. Their points of view were entirely different. After all, the principal task of the scientist was the search for truth. He did not think anyone would accuse politicians of wasting too much time in that quest. (Laughter.) "It is only natural to suppose," continued the chairman, "that politicians do not see much use in men who follow up such a foolish—if not actually reprehensible—practice of not looking for facts, but publishing them." (Laughter.)

Dealing with the Society itself, Professor Louis said that it was flourishing, and, with its 5,700 members, was now one of the leading technical societies in the country (applause). Speaking of the future he said that the chemical industry was intimately bound up with industry in general. He believed there were dark days before British industry, but he had confidence in the sound common sense of the average British citizen pulling them through. In the days when industry was normally re-established and prosperous, they would find that the chemical industry had played its part in the reconstruction. (Applause.)

"Armstrong College"

Dr. E. F. ARMSTRONG, F.R.S., proposed the toast "Armstrong College," coupling it with the name of Sir Theodore Morison, the principal. Armstrong College, he said, was the centre of learning in that great city, and its learning and influence, though sometimes unseen, had pervaded the whole county of Northumberland. He also referred to the new recognition of chemistry and deprecated the continued use of the word "stinks" when referring to it.

Sir THEODORE MORISON, in replying to the toast, referred to the long association of Armstrong College with the national Society and with the local section. The latter association, he felt sure, had been a distinct benefit to the college. It was such visits as their's to the college which brought them into contact with practical men that took away the reproach of esoteric learning from the provincial college. He thought that the connection between the learning of the colleges and the practical work of the world would be the distinctive feature of the new universities. He agreed that pure science and scholarship might be followed with greater success in the quiet backwaters of Oxford and Cambridge, but he thought there was a special advantage for provincial universities in that they lived in close association with practical men engaged in industry. He made a plea for the development of the idea of interchanging French and British students as a sound means of establishing a real entente between the two countries.

Col. W. C. BLACKETT proposed the toast of "the City of Newcastle," and the Lord Mayor responded in a short speech, in which he said that as a commercial man he realised how important the chemical industry was to such a district as Tyneside.

"Kindred Societies"

Sir W. J. POPE, president elect of the Society, in proposing the toast of "Kindred Societies," said: "The toast of 'Kindred Societies,' which has been entrusted to me, introduces a large subject because the Society of Chemical Industry claims kinship with all associations which have for their object the advancement of science and technology. I may, therefore, be permitted to confine my remarks to the youngest of our sister societies.

"The French Society of Chemical Industry is not yet two years old, but, during this brief period, it has given evidence of remarkable vivacity and has already taken a high position among the scientific societies of the world. The French Society has, of course, to some extent modelled its procedure upon that of our own, but, at the same time, it has introduced certain novelties of method which are worthy of our most serious consideration. The monthly *Journal* of the French Society of Chemical Industry is a literary production and its contents exhibit all that precision and all that genius for expression so characteristic of our neighbours across the Channel; each number contains at least one article which deals comprehensively with some great chemical question of industrial or economic importance. In spite of the recognised value of our English *Journal* we cannot but admit that we have much to learn in the art of presentation of important matter from the official organ of our French colleagues. One other point is perhaps of importance. During numerous recent visits to France I have had occasion to observe that the *Journal* of the French Society of Chemical Industry is on sale at the railway bookstalls; this, together with the very large amount of lucrative advertisement matter contained in the French journal, should attract the earnest attention of those gentlemen who devote themselves, so much to our advantage, to the finance of our Society.

"No mention of the French Society of Chemical Industry can be dissociated from the name of the man who founded that Society, whose initiative and genius directed its early policy, whose organising ability enabled him to gather together a band of collaborators who have made the new French journal one of the ornaments of modern scientific literature, and who was, in fact, the only possible first president of the young Society. Monsieur Paul Kestner is known to us all as one of those great chemical technologists who have arisen from time to time, each of whom has, in his own unique fashion, assisted in establishing the chemical industry in its present commanding position; his inventions, and the driving force with which he has vitalised those inventions and made them powerful agents in the amelioration of many of the conditions of life, have made the name of the first president of the French Society of Chemical Industry a household word in the scientific community of every civilised country.

"I might speak this evening at such length on this theme as to exhaust my audience without exhausting my subject; actions, however, speak louder than words, and our Society, in conferring its medal on M. Kestner, has proclaimed more forcibly than I could ever hope to do, the position which this great Frenchman has gained for himself as a pioneer in one of the most rapidly expanding branches of productive activity.

"In drinking to the success of the French Society of Chemical Industry and to the health of its first president, I shall carry everyone present with me in expressing an honest desire for the establishment of a closer relationship between our two Societies. Each of our nations has much to gain from a more intimate alliance of this kind. The casual observer might possibly, at first sight, think it remarkable that so much exists in common between the most exclusive of the Anglo-Saxon races, ourselves, and the French nation, which represents the most exquisite and the most artistically minded product of the old Latin civilisation. I am sure, however, that if M. Kestner does me the honour of replying to these few words of mine, you will carry away the conviction that his ideals in life are identical with ours. The events of the last six years have proved to demonstration that France and Great Britain are one and indivisible in their conception of the aims, the destinies and the honour of the human race.

"I desire to propose the toast of "Kindred Societies," coupling the toast with the name of M. Paul Kestner, President of the French Society of Chemical Industry."

M. Paul Kestner's Reply

M. PAUL KESTNER was unable to proceed with his response for some time, the members rising and singing "For He's a Jolly Good Fellow" with enthusiasm. M. Kestner was obviously deeply moved by the demonstration. In his reply he reminded them that he was representing one of the youngest societies—that of his own country. Established during the war, it had been created in a spirit of brotherhood. They considered their Society a daughter of the British Society and a daughter of which he hoped they would be proud. That gathering followed shortly after a very important gathering in Rome, and the fact that in future all associations of pure and applied chemistry were united was an event of great importance. He was a firm believer that many of the inevitable misunderstandings between nations would be dissipated by unions of associations such as their's. He made a graceful reference to Sir Charles Parsons, Stephenson and other great scientists of the district, and concluded by looking forward to a more and more intimate union between chemical associations and, above all, between the French and British Associations. (Applause.)

Visits to Works

One of the pleasing features of the social functions connected with the annual meeting was the manner in which various clubs in the city opened their doors to the members. Not only the Chemical Industry Club, but the Conservative, Union, and Liberal Clubs also extended the right of membership to all delegates during their visit to Newcastle. The civic reception which was given the delegates in the Laing Art Gallery by the Lord Mayor (Councillor Walter Lee) and the Corporation, was attended by many influential citizens of Newcastle. The local section in general, and their secretary, Mr. H. Dunford Smith, in particular, put in some splendid work, and were responsible for organising an excellent conversazione in Armstrong College, while on Friday evening, after an enjoyable visit to the Roman Wall at Chollerford, the members were again entertained by the local committee at an "At Home," held in the Chemical Industry Club.

Visits to various works in the district, ably conducted by local members, were considered time well spent by all. The following summary indicates the nature of the visits :—

Wednesday afternoon was devoted to the Tharsis Copper Works, Hebburn-on-Tyne, when Mr. O. Smalley and Mr. P. L. Robinson acted as guides. A second party, led by Mr. J. A. Carr and Mr. G. W. Hewson, had an opportunity of inspecting the gas power station and the cleaning plant at the works and shipyards of Messrs. Palmers, of Jarrow. The visit was an exhaustive one, and the visitors were keenly interested in the gas cleaning plant. Under the guidance of Dr. J. H. Paterson and Mr. W. Diamond, the shipyards of Swan, Hunter & Wigham Richardson were visited, and Dr. Paterson proved himself an extremely interesting and capable guide, being responsible for many of the innovations introduced into the yards. Demonstrations of the work of the electric welding plant were given for the benefit of the party. On Thursday a party travelled north for 18 miles, to Ashington, where the largest group of collieries in the Northumberland coalfield was inspected.

On the same day some of the members visited the Marley Hill Coke Ovens, under the guidance of the manager, Mr. W. Diamond. Sixty Huessner ovens, 32 ft. long by 6 ft. high by 1·5 ft. wide, and 20 ovens of the same type 35 ft. long by 8 ft. high constitute the plant at these works, and the coal is washed in a Blackett washer of six drums, washing down to 1 per cent. and delivering 50 tons in the hour. The ovens are of the waste heat type, and the average time for carbonising is 30 hours with stamped charges, and 25 hours with hand charges. The stamped charge is considered to give the better coke. The plant includes a sulphuric acid producer of the Simon Carvé type, intensive process. Eleven tons per day is about the normal output.

Dr. H. Peile, chairman of the Newcastle Alloy Co., Ltd., conducted a party over the firms works at Rowlands Gill, when the steel furnaces, ferro alloy furnaces, the works and boiler-houses, electric generating stations, and the cuprous oxide plant were inspected. The chairman outlined the work of the Company, mentioning that during the war the Ministry of Munitions looked to the firm for the whole of the nation's supply of ferro chrome. Reconstruction has been entered upon since the Armistice and much attention has been given to the production of low carbon ferro chrome in three new Heroult furnaces.

The Hayhole Lead Works of Messrs. Cooksons received a visit, Messrs. A. Short and J. B. Duncan acting as guides. The firm was established in 1704 and has connections as far afield as Mexico, where mining operations are carried on. The extent of the Tyne works can be realised from the fact that 260 tons of white lead alone are manufactured per week. That is only one feature of the firm's activities, another being the manufacture of litharge by a new mechanical process which is stated to be very satisfactory.

Chemical Exhibition

The exhibition in connection with the Annual Meeting of the Society of Chemical Industry at Newcastle was thrown open to the public on Monday, July 12. The exhibition was attended by a large number of people interested in all branches of commerce, and the arrangement of the exhibits reflects credit on the promoters. Below are some of the principal exhibits :—

The Premier Electric Welding Co., Newcastle, a petrol-driven electric welding set ; R. McIvor & Sons, Newcastle, roof-felting system and magnesite flooring ; Priestman Collieries, Ltd., and the Newcastle Benzol Co., Ltd., a model pit tub of coking coal with exact proportion of coke and by-products obtained from it ; Cookson & Sons, Newcastle, lead and antimony exhibits ; William Harrison & Co., miscellaneous chemical plant ; Meldrum, Ltd., acid elevators and pumps ; Foster, Blackett & Wilson, sheet and lead pipes ; Urwin & Co., scientific apparatus ; Locke, Blackett & Co., lead pipes and sheets, &c. ; Brotherton, Newcastle, tar products and dyes ; Newcastle Alloy Co., raw and manufactured materials ; Teams By-Product Co., coke and by-products ; Hoyle, Robson, Barnett & Co., Ltd., Newcastle, paints, &c. ; Bretts Oil & Grease Co., Ltd., lubricants, &c. ; Cameron, Swan & Co., Newcastle, "Witherite" ; Wailes, Bitumistic, Ltd., Newcastle, bitumistic enamel and solution and the Hirsch gas generating apparatus ; Gjers, Mills & Co., Middlesbrough, iron work ; Thermal Syndicate, Ltd., Wallsend, silica ware ; Weardale Lead Co., spar ; Messrs. Ridsdale, Middlesbrough, the "Analoid" system ; Newcastle Graphite Co., artificial electrodes ; Dr. R. Lessing, contact rings ; Cannon Iron Foundries, mixer ; Sininning-grove Iron Co., rolled sections ; Cape Asbestos Co., Ltd. ; Barton, Brothers, potassium ; Cleveland Magnesite & Refractory Co., refractory materials ; T. & C. Clark, Wolverhampton, cast iron goods ; Newcastle & Gateshead Gas Co., and the United Alkali Co., Gateshead, both had stands of exhibits ; Firth Brierley Stainless Steel Syndicate, Sheffield, also had a good exhibit.

Neutral Sulphate of Ammonia

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the letter by Mr. W. M. Valon, of Stafford, in your issue of the 17th inst. on the above subject, it may be desirable to draw the attention of anybody manufacturing, or contemplating the manufacture of, neutral sulphate of ammonia to patent No. 141,787, which has been acquired by my company, an abstract of which was given on page 591 of THE CHEMICAL AGE of May 29, 1920.—Yours, &c.,

For the Hydronyl Syndicate, Ltd.,
GEO. S. PITT,
Secretary.

July 19.

An English Packet-making Machine Wanted

To the Editor of THE CHEMICAL AGE.

SIR,—We take the liberty of asking you to help us in finding a manufacturer in England for a packet-making machine. We use these machines in our business, which is that of exporters of medicinal flowers, and so on, and we have need of machinery for making up the packets in which same are sold.

The machines must make up the packets in half and one kilo sizes (we enclose illustration of one of them). They must be made similar to packets of tobacco, with the important difference, however, that our packets must be compressed quite hard, both flowers and leaves.

At present we are working by hand machinery, which is a very slow process. We want electric or similar machinery, or if there is a very perfect hand system we should be interested. Please excuse our troubling you, but friends of ours here advise us you are the best people to aid us ; and, thanking you beforehand for your courtesy, we are &c.,

Piazza Fossatello, N.1, FRATELLI, COSTA & Co
Genoa, July 16.

Potash Extraction from New Jersey Greensands

By R. Norris Shreve

The following article, contributed by the author to " CHEMICAL AGE *" (New York), gives an interesting account of the Eastern Potash Corporation's scheme for extracting high grade potash compounds from New Jersey greensands. The plant, which is now being constructed on the Rariton River, near New Brunswick, is calculated to produce over 20,000 tons a year of caustic potash or its equivalent in other potash salts.*

THE greensand deposits on the Raritan River are made up almost entirely of the mineral, glauconite, which has hitherto been considered as a hydrous silicate of iron, potash and alumina. The greensand contains 7½ per cent. potassium oxide. Many attempts in the past have been made to get potash from silicates, and in fact a number of large plants have been built for this purpose. Practically all of these have worked on massive silicate rocks, such as feldspar, leucite, &c., in which case the rock had to be subjected to an expensive crushing and grinding process before any attempt was made to unlock the potash. Furthermore, in most cases these rocks were located in inaccessible regions where they were not only difficult of access but where the resultant potash compounds, more or less contaminated with soda salts, had to bear an expensive freight haul to reach the markets. The greensand deposits of New Jersery, used by the Eastern Potash Corporation as its raw material, can be mined easily by steam shovel and will be subjected to a freight haul of only a few miles to reach the company's plant. Furthermore, the greensand is comparatively easy to decompose as compared with feldspar and the like.

The process of decomposition which will be employed is that invented and patented by H. W. Charlton to cover the decomposition of feldspar and modified by T. C. Meadows and H. W. Charlton as applied to greensand. Under these patents greensand, lime and water are digested together at a fairly high temperature and pressure. Subjected to these conditions the potash in the greensand is converted into soluble caustic potash.

Some years ago the Eastern Potash Corporation established a small manufacturing plant at Jones Point, New York, for the purpose of solving, on the actual manufacturing scale, the problems connected with the extraction of potash from greensand. This plant was capable of treating ten tons of greensand a day, and a large scale equipment for the handling of the problem in all its phases was installed. These experiments involved an expenditure of about $300,000.

The new Raritan River plant will treat every day 1,000 tons of greensand for the recovery of its potash. The United States Geological Survey, in its report on the "Greensand Deposits of the Eastern United States," states that "the greensands of the Eastern States underlie the surface of hundreds if not thousands of square miles within reach of the steam shovel. A square mile of greensand one foot thick will yield 78,000 tons of potash. A twenty-foot bed that covers a square mile should yield 1,500,000 tons of potash."

Methods of Treatment

The greensand will be treated with lime and water, and for this purpose about 900 tons of quicklime will be needed every day. This quicklime will be made at the Raritan River plant out of limestone which will be supplied from the company's quarries located at McAfee, Sussex County, N.J. The stone is a very high grade of metamorphic limestone running 93-96 per cent. calcium carbonate. Quarrying and crushing machinery is now being installed to supply 1,700 tons per day of the crushed limestone, which will be transported by a haul of approximately 50 miles to the company's Raritan plant.

For the burning of the limestone there is now being built the largest lime plant in the world. This will consist of 10 Vulcan Rotary Kilns, 8×125 feet.

The limestone, crushed at the quarry to a uniform one inch size, will be discharged from the railroad cars into an unloading hopper which will feed directly to a conveyor belt for carrying the material to small storage bins above the rotary kilns, from which it will be automatically fed into these kilns. Excess shipments will be dumped and removed to main storage space of 500 feet long by 147 feet wide by a large gantry crane, and piled for use in time of interrupted shipments.

The hot lime discharged from the kilns will be cooled in rotary coolers and slaked at the end of the cooler with an excess of water, thus giving a lime slurry which will be transported by pumps.

The lime kilns will be heated by oil and the waste gases will be collected and used under waste heat boilers, thereby producing 1,500 B. h.p., which will be equivalent to saving 50 tons of coal daily.

The greensand will reach the plant by barge in a fine granular sandy condition, and be unloaded by the gantry crane. As in the case of limestone, there is ample storage space to accommodate a supply, and the crane is of ample capacity to supply the normal demand of the grinding mills and take care of the storage. It will be conveyed to the greensand grinding building, where, mixed with water, the greensand will be ground so that 90 per cent. of it will pass a 200-mesh screen. This grinding will take place in tube mills. From the mills, pumps will elevate the ground greensand pulp to storage and measuring tanks, and thence to mixing tanks where the greensand, lime and water will be mixed in the proper proportions.

The resulting slurry will have a composition of 1 part of greensand, 1·2 parts of calcium hydroxide, and 4·8 parts of water.

The day's charge will consist of the following quantities: Greensand, 1,000 tons; quicklime, 900 tons; water, 5,100 tons.

The charge of the proper proportion having been prepared, it is then sent through the digesters where the conversion takes place. Here the slurry will be heated to 470°F., which is the temperature equivalent to 500 lb. saturated steam. To keep the water in the liquid phase, the slurry will be put under sufficient pressure to prevent the formation of steam. The slurry will be kept in the digesters at this temperature somewhat more than an hour's time, which will effect a conversion into the soluble form of about three-quarters of the total potash contained in the greensand.

The specific type of digesters that will be used are those developed by the company's engineers after long experimentation. These now are under construction. They consist of a heating-up element comprising a coil within a shell. The slurry is pumped continuously through the coil which is surrounded by steam of 500 lb. pressure. After thus having been brought up to the proper temperature the slurry is conducted into cylinders where the reaction progresses to the desired stage. The hot slurry will enter one end of these cylinders continuously and will leave at the other end. Several of these cylinders are to be connected in series and their size and dimensions are so chosen as to hold the hot slurry for the length of time necessary to effect conversion.

After leaving the digesters, the hot converted slurry will have its heat removed in slurry boilers, which are simply special boilers in which the hot liquid is used as the source of the heat and thus generates steam for the plant. The excess pressure of the slurry is removed by friction in small pipes. The slurry now cooled below the boiling point of water is filtered in standard filters and the liquid caustic potash thus obtained is sent to the evaporator building for concentration.

In the evaporator building is located a large Manistee quadruple effect evaporator, which will be employed to concentrate the caustic potash to 45° Be. This evaporator plant, now under construction, will have a guaranteed capacity of 5,000 tons of water evaporated in each 24 hours, utilising exhaust steam exclusively.

The 45°Be. caustic potash solution will be concentrated further to the ordinary 90 per cent. solid caustic in the regular type of cast iron caustic pots which will be heated by oil.

A number of potash compounds other than caustic potash will be made; for example, potassium chloride, potassium chlorate, potassium nitrate, potassium sulphate, potassium carbonate, potassium bicarbonate.

The purity of all of these compounds of potash as produced by the above described process should be very high. The greensand in the first place contains practically only traces of

sodium compounds, being totally unlike most other potash minerals in this respect. Furthermore, the greensand carries merely traces of chlorides and of sulphates, so that the caustic potash obtained will have only very small amounts of these contaminating impurities, being in this respect a very exceptional product.

Utilisation of Residuum

Turning to the residue separated by filtration from the liquid caustic potash, the company proposes to utilise this in a number of different ways.

For example, the excess lime and the silicates formed in the reaction are capable of reacting with the silica of sand to form a variety of ceramic products.

The company is now preparing designs for a plant to make 500,000 bricks per day out of this residue. This is to be carried out by mixing the residue with sand, and pressing this material into bricks. These bricks are then placed in hardening cylinders and subjected to 150 lb. steam for some hours to effect the reaction between the cementitious materials of the residue and the sand.

These bricks have been produced now for several years at the company's experimental plant at Jones Point, New York, and have successfully stood exhaustive tests. The brick now being used in building the Raritan plant has been made at the company's experimental works. Other ceramic products, especially stucco and various moulded forms, have been made out of this residue.

The residue, carrying as it does about 50 per cent. of lime together with considerable silica in a very finely divided form, will also find a large outlet in the fertiliser industry where lime and silica are needed.

Altogether, the Eastern Potash Corporation's plant at Raritan River will be the most important factor in the United States in the production of high grade potash compounds, and the company is planning to meet the requirements of the chemical trade as well as the demand for fertiliser purposes.

Colour Users' Association

Important Statements by the Chairman

MR. VERNON CLAY (chairman), addressing the first annual meeting of the Colour Users' Association at Manchester on Tuesday, said that there were two very urgent reasons why the dye industry in England should be developed to the very utmost. One was the real necessity that existed from the commercial and industrial side, and the other the necessity from the national security side. If we were to enter upon another great war it was imperative that we should have colour dyes. As to the necessity for dye-making from a commercial and industrial point of view, it was the key industry and linked up a great number of the large industries in this country. If all the facts that were known were made public much of the capital that was subscribed for industry in this country would not be forthcoming. It would be said: "You are not secure in this country; you cannot have my money."

What was needed first of all, from the point of view of national security, was the absorbing of highly-trained brains and constantly finding more. The Germans in the late war could have broken through and gained a strategical success on chemical war alone, but they were foiled because they did not do it on a large enough scale. Therefore we must have in this country an industry capable of supporting science to the highest degree. We must have also plant which would produce in volume, so that we could meet any plant in existence in the event of another war. The dye-making plant was the most adaptable plant in the country.

Relations with the Government

The dye industry was essential for commercial success and without commercial success they would not get the brains going. The Reconstruction Committee (of which Mr. Clay was chairman) had been taking this matter up with the Government. There had been a good many discussions, and he had now the authority to tell them, through the President of the Board of Trade, that it was the settled opinion of the Government that for national security it was essential that synthetic colour-making factories should be in existence, should be maintained by a staff of chemists and other experts, and should be equal to those of any other possible hostile nation. The Government was also firmly of opinion that this must be done without undue injury to colour users and without placing the textile and other industries in a disadvantageous position.

As colour consumers they did all in their power to develop the dye industry of the country, but there were certain ways of establishing it. They could not have the pre-war position, and tariffs were impossible because of the fluctuating rate of exchange. The Government had said definitely that the subsidy was unworkable, but they had come to the conclusion, and the President had given him permission to say so, that they were going to bring in a licensing and prohibition Bill. He could not give the text of the Bill, but they had got to work the Bill to the best of their ability, although it would mean their constitution being altered. Instead of being a voluntary body, as now, they would have to form themselves into a company limited by guarantee and capable of entering into obligations.

Whatever legislation was brought in, it would firmly establish the dye industry of this country; but it was the bounden duty of all dye-makers, after they got legislation, to help the association to do their bit. They must get the industry on a firm basis and stand on their own efficiency. Sir Robert Horne had asked him to meet other interested parties next week in order fully to discuss the type of machinery that would be necessary. The Government had already agreed in principle to certain schemes of research, and had allocated £500,000, but he could not say that it was specifically ear-marked for the dyeing industry.

Reparation Dyes

Mr. C. Rawson, chairman of the Technical Advisory Committee, said that if the Allies exercised their option fully under the reparation clauses of the Peace Treaty, Great Britain should receive 3,300 tons of dyes from Germany. The Committee had endeavoured on several occasions to obtain from the Board of Trade definite information regarding the amount of colour to be allocated to this country, but without effect. Up to the present the consignments did not account for more than 1,500 tons, and it was doubtful if all that amount had actually been received. In January last the Advisory Committee visited Germany and purchased 140 tons of dyestuffs at a value approximately of £192,000, and options were also secured on about 700 tons at an approximate value of £1,000,000, but the colours subject to option could only become available when the corresponding amount of reparation colour was released and delivered to the Allies. The option terminated on July 1, and the Bayer Company asked to have the date extended, but the Committee decided not to agree to any extension. The amount of colour received from Germany on this account up to the present was about 220 tons, and it was valued at approximately £345,000.

Some months ago, with a view to upholding the principle of collective purchasing of German dyes as the best policy for all concerned, the members of the Committee, with the sanction of the firms and combines they represented, agreed among themselves to refrain from buying colours individually, either direct or through agents—a course which was, however, found to be impracticable, as German colours were coming into the country freely. The firms represented that the Committee were being seriously handicapped, and finally it was decided to rescind the agreement previously made not to buy individually.

Mr. Henry Allen was elected the first president of the association.

Lord Moulton's War Work

Tribute from British Chemists and Chemical Manufacturers

A DISTINGUISHED company of British chemists and chemical manufacturers met at the Savoy Hotel on Wednesday evening at a dinner given to Lord Moulton, in recognition of his services during the war as Director-General of Explosive Supplies. Sir William Pope, President of the Society of Chemical Industry, presided, and proposed Lord Moulton's health. Mr. Emile Mond, on behalf of the guests, presented Lord Moulton with a large silver loving cup suitably inscribed, and Lord Moulton replied in a speech in which he particularly emphasised the national aspect of the chemical industry. Sir Hugh Bell proposed the toast of the Chairman, to which Sir William Pope replied. A full report of the proceedings will appear in our next issue.

Alleged "Ring" in the Salt Trade.

Conclusions of Committee of Inquiry

WE have received from the Board of Trade a copy of the findings and decisions of a sub-committee appointed by the Standing Committee on Trusts "to inquire into the existence of a ring in the salt trade and the effect of any such ring upon prices."

General Conclusions

The Sub-Committee's conclusions are summarised as follows:—

(1) There is in the salt industry a trade combination, viz., The Salt Manufacturers' Association.

(2) This Association fixes—directly or indirectly—the manufacturers' selling prices for 95 per cent. of the salt sold in this country.

(3) Except for small retail transactions, the Association fixes, at all stages, the prices at which most of the salt sold in London is sold.

(4) Neither the quantity of salt produced by manufacturers outside the Association nor of imported salt is at present sufficient to affect adversely the business of the members of the Association, or to cause a reduction in price.

(5) The action of the Association has increased very materially the prices of salt in this country.

(6) The Association has abolished the price cutting which formerly made the salt trade barely remunerative and has made the trade remunerative to both manufacturers and merchants.

(7) The standard of prices aimed at and achieved is such as has enabled the manufacturing company, responsible for 60 per cent. of the total output of this country and whose costs of production are highest (viz. The Salt Union) to make instead of a loss on salt, a profit, which in combination with the profit on other trading has sent their shares to a substantial premium upon the reduced nominal value (claimed by The Salt Union to be a fair representation of the company's assets).

(8) Whilst admitting that the dividend paid by The Salt Union for the financial year 1918 on the ordinary shares was equal to only 6 per cent. on their original nominal value, we find that the revenue made in that year from all sources was sufficient to provide, *inter alia*, for (*a*) the payment of 15 per cent. on the actual ordinary share capital (as reduced in 1902 to represent the assets of the company), (*b*) an addition to reserve of £50,000 equal to 6¼ per cent. on the reduced ordinary share capital, and (*c*) an expenditure of £100,000 for current repairs, in addition to £100,000 for deferred repairs, the latter (which will not presumably be a recurrent item) being no less than 12½ per cent. on the ordinary share capital.

(9) The prices ruling on December 31st, 1919, were such as to give The Salt Union (together with other trading) results differing little from those referred to in paragraph (8), and to give other manufacturers, who produce salt more cheaply than the Salt Union, a very liberal profit on that commodity.

(10) We are decidedly of opinion that no justification can be shown for any further increase in the prices ruling on December 31st, 1919, unless and until the cost of labour and/or fuel increases, and then only in proportion to such increase in cost of production.

(11) We think that with a view to reduction in the cost of manufacture and in the selling prices, the possibility of improvement in methods of production should have received more attention in the past than it appears to have received. We understand that considerable regard is now being paid to this subject.

(12) There is no evidence of a monopoly of brine supplies, nor is there any actual shortage of manufactured salt.

(13) In view of the low price of salt in relation to weight, the prevailing high cost of all means of transport is an important factor in the price to the salt consumer.

All-round Increase of 5s. 6d. per Ton.

Since the above report was written, the Sub-Committee state, it has come to our knowledge that on May 1st an all-round increase of 5s. 6d. per ton was made in the manufacturers' prices fixed by the Association. Upon inquiry we are told that this is necessitated by an increase of wages of 8s. per week, and an increase in the price of coal of 2s. 2d. per ton due to increased railway rates, since July 1919 (when the price of salt was last increased). Moreover, we are now informed that a further increase of wages of 3s. per week, which comes into operation on June 1st, and the recently announced increase in cost of industrial coal of 4s. 2d. per ton will necessitate a further increase in the price of salt of 1s. 6d. and 3s. 2d. per ton respectively, making 4s. 8d. in all.

During our investigation we were told by the representative of the Association that although there had been several increases in wages since the price was last fixed, the trade had decided not to increase the price to cover them. These increases are based on the scale submitted to but not approved by the Ministry of Food (*vide* para. 7 of report). Without a thorough accountancy examination of the books of the salt manufacturers we are not able to state whether that scale is a correct and reasonable one. If, however, (as seems to us probable), it is based on the cost of production by the open pan method, with direct coal fires, and on the costs of production of the Salt Union of Cheshire, then it cannot be admitted as a justifiable basis for increasing the selling prices of the entire produce of all the Salt Manufacturers.

Gas Fuel Instead of Coal Fuel

The Sub-Committee point out that very little research or improvement has, for generations past, been made in connection with the manufacture of salt, and with the exception of some half-dozen more or less scientific plants, the whole output is produced by the very old method of evaporation in open pans over coal fires.

The cost of fuel is a very large item in the manufacture of salt, and varies according to the quality of salt to be produced. Several cases, however, have come to our notice where, instead of coal, waste gases from blast furnaces or steam from power stations have been used, with a striking economy in cost of production. One firm was able, by this means, in 1913, to produce common salt at 50 per cent. of the cost of the Salt Union, Ltd., and to make a profit of 3s. 10d. per ton when other firms were suffering a loss. For the purposes of comparison of manufacturers' prices and profits, these cases have been ignored. In 1918 the firm in question was making a profit of 16s. 4d. per ton on common salt or 123 per cent. on cost, when the Salt Union, Ltd., were losing 2s. 4d. per ton.

Whilst it is not within our competency to enter into the technical practicability in any given case of such an economy in production as that referred to above, we are impressed by the fact that the ruling prices of salt are based on production by coal fuel, and that the economy effected by gas or steam fuel, where it is used, goes wholly to the manufacturers who have been able to adopt that method. We are, therefore, of the opinion that, where the means are available, the question of such economy in production should receive the consideration of the salt manufacturers, and that the consumer of salt should be allowed to participate in any such economy as may be found practicable. Were it not for the existence of the Association, such salt as is produced in this more economical manner, would probably reach the consumer at a considerably lower price, still leaving ample profit to the manufacturer.

There are, we understand, several plants in this country for producing salt by what is known as the "vacuum" process instead of by the open pan method. From evidence received we find that by the vacuum method the Salt Union, Ltd., can produce salt more cheaply by about 6s. per ton than by the open pan method. We are told, however, that "vacuum" salt, being about 25 per cent. denser than "open pan" salt cannot economically be used for many of the purposes for which the more coarse grained salt is used, *e.g.*, fish-curing, packing, &c., and that research has failed to provide a means of varying the size of the crystals produced by the vacuum process. In the unstoved form, vacuum salt is used as "Butter" salt, and by one firm is produced at less than half the cost of "open pan" salt of other manufacturers; in the stoved form it is used as table salt and is produced more cheaply by about 13s. per ton than by the "open pan" method of some other manufacturers. As, however, the greater quantity of salt is still produced by the open pan method, the ruling prices are fixed on the basis of the cost by that method. It would appear, therefore, that at any rate some qualities of salt might be produced by the more economical method and

that, on these grounds alone, those qualities of salt could in consequence be sold at a lower price than at present.

Formation of the Salt Union, Ltd.

Perhaps the most notable events, the Sub-Committee state, in the history of the salt trade were the formation in 1888 of the Salt Union, Ltd., and the purchase by the Union of about 60 works, at prices which appear to have been unjustifiably high. Presumably this action was taken with a view to eliminating competition, so as to ensure better prices for salt. Many of these properties were dismantled, apparently with the double object of curtailing supplies—which we are told were then greatly in excess of demand—and of effecting economies by, to some extent, co-ordinating and centralising production; other properties, we are told, have since become submerged owing to subsidences. The financial record of the Union, however, shows that neither the economies effected nor the increases in selling prices were sufficient to recompense the Union for the high prices paid for the properties, and that the increase in price which followed the formation of the Union could not be maintained, owing apparently to competition from unexpected sources.

The actual circumstances in which the works and businesses were originally acquired by the Salt Union, being so remote, have not been made clear to us, but an examination of the published accounts and reports of the Company, and other records, leads us to the conclusion that the prices paid for them must have been much in excess of their real value, that many of the plants were dismantled or disposed of at a great loss, that the administration charges, at any rate in the earlier years, were inordinately high, and that unusually heavy expenditure was incurred in litigation.

The failure of the Salt Union to create an effective monopoly was followed by a period of keen competition and resultant low prices, and it was not until the latter part of the year 1915 that these were effectively eliminated by the formation of the Salt Manufacturers' Association.

Costs of Production and Profits

The Sub-Committee give the following figures indicating the realised prices on the home trade and the costs of production averaged over all qualities produced by the Salt Union from 1913 to 1919:—

	Realised price per ton.	Cost of production per ton.	Loss.	Profit.
	s. d.	s. d.	s. d.	s. d.
1913	12 8·43	14 0·07	1 3·64	—
1914	12 4·91	14 2·76	1 9·85	—
1915	12 1·79	16 5·27	4 3·48	—
1916	27 5·57	23 9·72	—	3 7·85
1917	33 1·66	32 6·35	—	7·31
1918	45 2·12	42 0·12	—	3 2·00
1919	48 6·08	41 9·65	—	6 8·43

It seems, therefore, the Sub-Committee remark, that the prices of the Salt Manufacturers' Association were fixed so as to enable its chief member to make a profit on salt.

The following table of the Salt Union's profits 1912-1919 is given:—

Year.	Nett Profit.
1912	£80,146
1913	£82,791
1914	£89,442
1915	£140,523
1916	£380,555
1917	£287,380
1918	£333,828
1919	£302,781

In pursuance of their purpose of promoting the interchange of students between the United Kingdom and France, the Office National des Universités et Ecoles Françaises direct attention to the advantages offered to students in this country by the University of Grenoble, which has assisted in the formation of a Comité de Patronage des Etudiants Etrangers. The technical studies at the university are centred at the Polytechnic institute, one branch of work being devoted to electricity and hydraulics and another to applied chemistry, with special attention to electro-chemistry and the production of paper. The town of Grenoble is situated in the centre of the "White Coal" district, and much of the activity in power transmission and electro-chemistry in France has been due to the influence of this university.

Swansea University College

Appointment of Professors

PROFESSOR C. A. EDWARDS, D.Sc.(Manchester), M.I.M.M., Professor of Metallurgy and Dean of the Faculty of Science in the University of Manchester, as briefly announced in THE CHEMICAL AGE last week, has been appointed Professor of Metallurgy at Swansea University College. Professor Edwards has held the Chair of Metallurgy at Manchester since 1911, in which year he succeeded Professor H. C. H. Carpenter, F.R.S. Prior to going to Manchester he had held the following posts: Assistant chemist in the laboratory of the Lancashire and Yorkshire Railway Works, Horwich, 1903-05; assistant in the metallurgical department of the National Physical Laboratory, 1905-07; lecturer in metallurgy, University of Manchester, 1907-10; research metallurgist with Bolckow, Vaughan & Co., and afterwards with Messrs. Dorman Long & Co., Middlesbrough, 1910-14. In 1907 Professor Edwards gained the Carnegie scholarship of the Iron and Steel Institute. It is the ambition of the new Swansea University College to build up a department of metallurgy, which will be of the front rank both in teaching and research, and to establish a close relationship between university education and metallurgical practice.

Dr. E. A. Evans, who has been appointed Professor of Physics, is at present senior lecturer in physics and assistant director of the physical laboratories in the University of Manchester. Dr. Evans graduated B.Sc. at the University College of Wales, Aberystwyth. In 1902 he won a national scholarship in physics at the Royal College of Science, now the Imperial College, and in 1906 graduated B.Sc.(Lond.), with honours in physics. The D.Sc. degree of London University was awarded to him in 1916. Professor Evans has held the following posts: 1905-07, demonstrator in astro-physics at the Royal College of Science; 1907-08, demonstrator in physics at the same College; 1908-15, assistant lecturer in physics, University of Manchester. In 1915 he was promoted to the senior lectureship in physics and in 1919 was appointed assistant director of the laboratories. During Sir Ernest Rutherford's absence from Manchester University on special war work in 1917, Dr. Evans was in charge of the physics department. His researches, which are well known, have lain chiefly in the field of spectroscopy. His recent work has been chiefly concerned with the spectra of hydrogen and helium, the structure of spectrum lines, and the effect of strong electric fields upon them.

Dr. J. E. Coates, D.Sc.(Birmingham), M.Sc.(Wales), F.I.C., has been appointed Professor of Chemistry. Graduating B.Sc.(Wales) with first-class honours in chemistry, he was elected a Research Fellow of the University of Wales after a year of research in organic chemistry at University College, Bangor. Professor Coates held his Research Fellowship at University College, London, under Sir William Ramsay. From London he proceeded to Germany in 1907, and for two years carried on research work at Karlsruhe under Professor F. Haber. He afterwards held for one year an appointment as research chemist in the Osram Electric Lamp Works, Berlin. Leaving Germany he took up in 1910 the position of lecturer and demonstrator in chemistry in the University of Birmingham. In 1911 Dr. Coates was appointed lecturer in physical chemistry at the University. In 1915 he was commissioned to establish and conduct at Stratford a naval experimental and chemical manufacturing station, which became the chief centre for the manufacture of anhydrous prussic acid and the chief source of supply to the Navy and Mercantile Marine of the different types of fog and smoke apparatus used in the war. The researches which Professor Coates has carried out in universities have been concerned with the densities of liquidified gases, the behaviour of flames under high pressure, and the rate of combination of nitric oxide and chlorine.

The commencing salaries attached to the three positions at Swansea are respectively £1,250, £800 and £800 per annum.

The *Svenska Dagblad* of Stockholm announces that two factories have begun to produce fuel from the solid matter in the refuse of the sulphite cellulose factories. Sweden can in this way produce fuel equal in heating power to 100,000 tons of English coal, of a value of 100,000,000 crowns (over £5,000,000).

British Pharmaceutical Conference

Increased Use of Synthetic Drugs

THE fifty-seventh annual meeting of the British Pharmaceutical Conference was held in Liverpool this week. On Monday evening the Lord Mayor and Lady Mayoress gave a reception at the Town Hall to over 600 guests as a preliminary to the business of the Conference, which took place on Tuesday and Wednesday.

In his presidential address on Tuesday, Mr. C. A. Hill dealt with the changes in pharmacy brought about by progress in science, the most outstanding of which, though by no means the only change, being the increased use of synthetic drugs. The use of synthetic remedies in medicines, Mr. Hill said, was sometimes said to date from the introduction of antipyrin in 1884, but chloroform and chloral hydrate had long been known and used, and synthetic salicylic acid was freely used in 1877. Hypnone (acetophenone) followed in 1885, antifebrin (acetanilide) in 1886, and these were succeeded by phenacetin, sulphonal and trional, and since then there has been a steady flow of new synthetic drugs. To-day the world's annual consumption of phenazone or antipyrin may be roughly estimated at 100 tons, of phenacetin 250 tons, and of medicinal salicylates (sodium salicylate, methyl salicylate, aspirin and salol) at no less than 2,500 tons, and these are a few only out of the multitude of pure chemical substances used in medicine.

Notwithstanding the phenomenal extent to which synthetic drugs have come into use, and despite the increased employment of active principles according as our knowledge of these progresses, the use of the drugs themselves in the form of galenical preparations whether "standardised" or not, continued, Mr. Hill stated, to a remarkable and perhaps significant extent. Furthermore, signs were not wanting of a growing recognition of the truth that many a drug and many a food might contain valuable properties not readily determined by chemical methods. It might be only slowly that the full value of a drug discovered empirically could be stated in scientific terms. Paradoxical as it might seem, the tendency to-day, with advancing scientific knowledge, was to recognise the failure of the active principle to replace the parent drug.

Replacing Natural Drugs by Synthetic Substances

The replacement of a natural drug by a synthetic substance might be conceived as proceeding ideally in four stages. First the drug is examined chemically, and from it is isolated a pure substance, frequently an alkaloid or glucoside, which upon being subjected to physiological tests is found to have an effect similar to that of the parent drug; such a substance is termed the "active principle" of the drug. The second stage is to determine the chemical constitution of the isolated active principle, generally a matter of extreme difficulty taxing the resources of our most brilliant organic chemists, which Mr. Hill said, is equally true of the third stage, which consists in effecting the synthesis of the substance. Once the synthesis has been successfully accomplished there only remains the fourth and last stage, which is the manufacture of the substance upon a commercial scale. The case of suprarenal gland and adrenalin affords an illustration.

"It does not follow as a matter of course," Mr. Hill said, "that if the synthesis of a substance be accomplished, the artificial or synthetic article will replace the naturally occurring one. Supposing quinine were to be synthesised, it is by no means to be assumed that it would be cheaper to produce it on a large scale in the laboratory than to get nature to conduct the synthesis, and then to extract the alkaloid from cinchona bark and subsequently purify it. It has been amply illustrated in the case of cinchona bark that it pays to subsidise nature and to encourage her to increase her yield. Intensive culture may be a better business proposition than laboratory manufacture.

"By far the larger number of chemical substances used in medicine are not the active principles of natural drugs. It would lead me beyond the confines of my address to attempt even a cursory survey of what has been accomplished in the limitless field of synthetic drugs, to the enormous consumption of which I have already made reference, or to make more than the barest mention of the fact that synthetic organic substances are employed as antiseptics, anæsthetics, narcotics, hypnotics, antipyretics, and in the treatment of disease, notably those of parasitic origin.

"Nor need I remind you of the many attempts made by chemico-physiologists to correlate chemical constitution and physiological action. Much chemical and physiological work has been done in this fascinating field of research, and certain generalisations have resulted by deductive reasoning from very numerous data, yet it has to be admitted that really very little is known of this borderland subject. The physical condition of the substance, its solubility, especially its relative solubilities in different solvents ('partition co-efficient'), its adsorptive power, osmotic properties, and other physical properties have as much to do with its physiological action as has its constitutional formula. It may, indeed, be that the purely chemical action of a drug is destined to play a subordinate rôle in therapy and that, in the past, the physical action has not been sufficiently considered.

"Chemotherapy shows clearly that the physiological action of a substance is not due to one constituent only of that compound, but that it depends largely upon the molecular orientation of the compound and the ratio of adsorption which exists between it and the protein colloidal particles through which this or that constituent is going to act. Consider arsenic for example. In the treatment of disease, plain liquor arsenicalis is not so effective as colloidal arsenic sulphide, nor is the latter so effective as arseno-phenyl-glycine, nor the last so effective as di-amino-arseno-benzene. They all contain arsenic, but the last in virtue of its amino groups is able to be adsorbed in very large quantities by the protein colloidal particles, consequently the greatest amount possible of the element gets taken up. So far as can be seen at present the amino-groups are of great importance in a chemotherapeutic compound, especially if they can be placed in the ortho-position to the element one wishes to incorporate.

"Of greater importance than the group is the molecular orientation; one needs only to mention the effect of introducing an acetyl group to illustrate this point. Compare di-ortho-amino-thio-benzene with its acetyl derivative; the former is practically a specific for metallic poisoning, while the latter is as inert as plain colloidal or sublimed sulphur. Even di-para-amino-thio-benzene cannot compare with the ortho body. The addition of an acetyl group to salicylic acid results in a new analgesic property, while at the same time the undesirable after-effects of salicylates are in some measure eliminated. A similar addition to phenetidin gives phenacetin with its valuable antipyretic properties. On the other hand, the addition of an acetyl group to para-hydroxy-phenyl-ethylamine (an active principle of ergot) results in loss of activity. The introduction of an acetyl group into the choline molecule converts this comparatively inert substance into a powerful heart poison. Highly interesting is the case of aconitine. This intensely poisonous alkaloid is the acetyl derivative of benzaconine, the latter substance being relatively non-toxic. Yet the introduction of further acetyl groups into the aconitine molecule does not increase but diminishes its toxicity.

"It is a commonly expressed view that the growing use of synthetic drugs is to be regarded as a slow revolution in pharmacy, an observation often coupled with a reminder that the manufacture of organic synthetic substances has not been a British industry.

Difficulties of the Fine Chemical Industry

"Considering synthetic drugs from the point of view of their manufacture, we find that in very many of them alcohol is necessary, either as a solvent or as a reacting constituent, *e.g.*, adalin, anaesthesin, phenazone, chloral, veronal, sulphonal, urethane, phenacetin and many others. Individually each one may not be sufficiently important to warrant legislation nor change of departmental attitude or administration, but collectively these, and other pure chemicals not used in medicine, mean the organic fine chemical industry. The use of duty-free alcohol without unduly harassing restrictions is essential for the establishment of this branch of manufacture, with which goes progress in the discovery and introduction of new substances into medicine; but it is a wider question still, for this class of manufacture is one branch of the fine chemical industry which must be considered as a whole. The importance to the country of establishing upon a firm basis the fine chemical industry, in which previous to August 1914 Germany stood supreme, has been argued so frequently and so convincingly during the past six years, that further reference to it

ought to be unnecessary, yet unhappily this is not the case. Now, before the industry is sufficiently strong to resist the onslaught, it is exposed to attack from abroad by the unrestricted importation of foreign fine chemicals. As if to make assurance doubly sure, this infant industry is in process of being strangled at birth by the Excess Profits Duty. Starved of alcohol and stifled by the E.P.D., what remains is being done to death by the Sankey judgment.

"But this is neither the time nor the place to re-argue the national importance of the fine chemical industry. I wish merely to point out that advance in this branch of medicine is bound up indissolubly with the rest of fine chemical manufacture.

Moreover, it may be remarked that there is not such a strong inducement to produce new synthetic compounds as there would be if there were ready to hand adequate facilities for clinically testing such products and subsequently introducing them into medical practice. In this respect British firms are placed at a serious disadvantage as compared with their rivals in other countries."

Mr. Hill then reviewed the naturally occurring drugs and their chemical or active constituents and the recent advances in bio-chemistry, and finally emphasised the necessity for further pharmaceutical research, urging that if the future of the industry were to be made more bright it would be by cultivating assiduously the scientific side of pharmacy, by the promotion, encouragement, and assistance of pharmaceutical research, by the improvement of pharmaceutical products, and by keeping pharmacy abreast of advances in chemistry, physiology, bacteriology, vaccine-therapy and other kindred subjects.

Edinburgh's New Chemical Laboratories

THE new chemical laboratories of the University of Edinburgh, the foundation stone of which was recently laid by the King, are to be known as the "King's Buildings." These buildings are to be erected as separate blocks on a site of 115 acres on the southern outskirts of the city, about 2 miles distant from the Old College. The general lay-out of the laboratories was planned by Professor J. Walker, who has worked in collaboration with Mr. A. F. Balfour Paul, the architect of the building. The building is rectangular in plan, having a frontage of 220 ft. and a depth of 320 ft. Three corridors, one central and one on each side, run backwards through the whole length, and are connected by a cross-corridor in the front portion. This arrangement permits of indefinite extension by increasing the depth of the building. Between the central corridor and the side corridors are situated the main laboratories with their stores and service-rooms, as well as the lecture department. Each main laboratory (of which there are five) measures 70 ft. by 45 ft., and receives north light from a saw-tooth roof. Smaller rooms used in conjunction with the main laboratories are situated across the outer corridors, and are lit from the side. The whole building is of one storey, except the frontage block and the front part of the east and west wings, which are two storeys in height. In these will be housed administration, library, special laboratories and research-rooms. When complete the department will provide places for about 400 students working simultaneously. It is estimated that the total cost of the chemical laboratories with fittings and equipment will be approximately £250,000.

Chemical Manager's Claim

THE trial was to have been resumed on Wednesday at Manchester Assizes of the action brought by Dr. Ernest Ehrhardt to recover damages placed at £9,000 from Messrs. Brotherton & Co., of the Mersey Chemical Works, Birkenhead and Leeds, for alleged breach of agreement to employ him as works manager at a salary of £2,100 and commission for a period of five years, of which only two years had expired. At the opening of the court, Mr. Atkinson, K.C., leading counsel for plaintiff, stated that the court would not be further troubled with the case, as it had been settled on terms which were quite satisfactory to his client. Mr. Langdon, K.C., for defendants, said that, having heard the explanation given, his clients felt that justice would be done in the settlement that had been arranged.

June Trade Returns

THE trade returns for June show a decrease of £2,967,072 in exports, compared with last month's past war record, and an increase of £4,157,000 in imports. Consequently the adverse balance of trade, which had fallen to the comparatively low figure of £26,754,000 has gone up to £34,014,000. According to expert estimates, however, this last sum is well within the amount represented by our invisible exports, and it remains considerably less than the differences recorded in April and March, namely, £40,495,000 and £45,916,000 respectively. A notable feature of the imports is the further fall in purchases of raw materials, amounting to £2,589,000. In the case of oil seeds, nuts and fats, the decline is no less than £3,139,000, and for hides and skins the fall is £588,000. The value of manufactured goods imported was £4,000,000 higher than in May.

The value of the chemicals, drugs, dyes and colours imported last month was £3,419,550, an increase of £1,749,639 over June, 1919; of oil seeds, nuts, oils, &c., £5,929,057, a decrease of £440,920; hides and skins, undressed, £2,483,020, an increase of £251,441; oils, fats, and resins, manufactured, £6,717,302, an increase of £2,906,802; leather and manufactures thereof, £1,551,428, a decrease of £1,226,029.

Regarding exports, we exported chemicals, drugs, dyes and colours to the value of £3,311,093, an increase of £1,544,238; oil seeds, nuts, oils, &c., £1,131,072, a decrease of £404,992; hides and skins, undressed, £176,746, an increase of £46,975; oils, fats, and resins, manufactured, £1,297,078, an increase of £386,279; leather and manufactures thereof, £838,766, an increase of £416,630.

Taking the quantities as distinct from values, we exported 8,887 tons of oils, fats, &c., against 27,452 tons in June, 1919; china clay, 35,346 tons, against 19,489 tons; coal tar, pitch, 37,190 tons, against 53,958 tons; coke and fuel, 343,424 tons, against 239,368 tons; soda compounds, 887,895 cwt., against 495,878; dyestuffs, 23,899 cwt., against 12,306 cwt.; painter's colours, 112,998 cwt., against 118,380 cwt.; soap, 187,311 cwt., against 196,008 cwt.; candles, 22,189 cwt., against 13,113 cwt.; linoleum, 3,204,700 sq. yds., against 310,611 yds.; cement, 55,219 tons, against 37,336 tons.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Christiania ...	Chemicals	105
New York ...	Chemical Products	112
Italy... ...	Chemical Products	98; 100
Vancouver*...	Chemicals	—
Quebec* ...	Oils; resin; turpentine, &c. ...	—

* Replies to Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, E.C.2.

Chemical Society: Subscription Increased

AT an extraordinary general meeting of the Chemical Society held on Wednesday, the following resolutions of the Council were confirmed:—

(*a*) That the entrance fee be reduced from £4 to £3 as from December 1, 1920.

(*b*) That the annual subscription to be paid by Fellows be increased from £2 to £3, beginning with the year 1921.

(*c*) That the life composition fee as from June 1, 1920, be £45, and for Fellows who have paid 10 annual subscriptions, £30; for Fellows who have paid 15 annual subscriptions, £22. 10s.; for Fellows who have paid 20 annual subscriptions, £18; and for Fellows who have paid 25 annual subscriptions, £15.

Revised Belgian Customs Tariff

Rates on Chemicals

A RECENT issue of the *Board of Trade Journal* contains a translation of the Belgian Customs Tariff, showing the coefficients of increase to be applied to the specific rates of the Tariff according to the Royal Decree of June 12, 1920.

With regard to chemical products there is an increase of 3 frs. on 100 kilogs of liquefied carbonic acid, acetic ether, and sulphuric ether, the previous Tariff Duty on which was 5 frs., 8 frs. and 5 frs. respectively. Acetate and sub-acetate (sugar and vinegar) of lead are duty free, as are also hydrochloric, nitric, oxalic, tannic, tartaric, and sulphuric acids; fuming sulphuric acid; sulphuric chlorhydrine (chlorosulphonic acid); sulphuric anhydride; alizarine; artificial alumina, hydrate of alumina, calcined alumina; alum and chrome alum; borax; casegum or casein prepared with alkalis for industrial purposes; clavellated ashes (potash, pearlash and weedash); chloride of barium; chloride of lime; chloride of magnesium (salts of magnesia); chloride of potassium; chromate of sodium; artificial cryolite; diastafor and other malt extracts intended for industrial purposes and previously denatured; purified glycerin; aniline oil and salts and other products derived from coal tar; soapless caustic lye; minimum (red oxide of lead); oxide of tin; permanganate of potash; non-alcoholic preparations of tin basis; non-alcoholic preparations of iodine basis; crude saltpetre (nitrates of potassium and sodium); ammoniacal salts; salts of silver; salts of potassium of all kinds (carbonate, chromate, nitrate, oxalate of potash, caustic potash, &c.); spring salts (Carlsbad and other similar); silicate of soda (soluble glass); caustic soda; calcined and crystallised soda; sulphates and suphites of soda; sulphates and sulphites of soda (Glauber's salts, &c.) crystallised and calcined, combined or not with sulphuric or other acids; sulphide of zinc (lithopone); and unenumerated chemical products.

The importation, transit, as well as the transhipment in a Belgian port, of poisonous substances, and more particularly of arsenical residues from the manufacture of aniline, are prohibited unless intended for industrial or commercial purposes.

Saccharin and Similar Products

The importation, manufacture, transportation, detention and sale of saccharin and similar products, as well as products containing saccharin or similar substances, are prohibited. By products similar to saccharin are understood chemical synthetical products having a sweet taste but no food value. Exception to this prohibition may be made in the case of saccharin and similar products when imported by chemists for medical purposes. The Minister of Finance will determine the requirements and formalities to be complied with by chemists admitted, on their application, to avail themselves of the benefits of this paragraph.

Dyes and Colours

Dyes and colours (Section 62) may be imported free of duty, and include the following:—Valonea nuts; azure or smalt; yellow berries; mountain blue and other unenumerated blues; dye woods; catechu and terra japonica; English ashes; cochineal; colcotar; copperas; turmeric, ground or not; extracts from tanning materials; madder; woad; indigo; lac in balls and leaves; liquid wine and beer lees; litharge; animal and Spanish black; gallnuts; orchil; pastels (other than drawing pencils); quercitron, arnotto, safflower or carthamus; zaffer; sumac; Cologne earth; litmus; vermilion; Bremen green, Friesland green, Brunswick green and other unenumerated greens; blue and white vitriol; zinc white.

Artificial dyes obtained by any chemical process, *inter alia*, artificial indigo, are also included.

Soaps

In the scented or toilet soaps section* an increase of 2 fr. per 100 kilogs is made on common soaps, the former duty being 7 frs. This item includes only common unscented soaps, in roughly moulded bricks or cakes, which are used for toilet as well as for other purposes (Sunlight soap and similar kinds). A 3 fr. increase is made per 100 kilogs of soap creams, hard shaving soaps, liquid soap and powdered soap, imported in small receptacles (boxes, tubes, cases, casks, small pots, &c.), the aggregate weight of container and contents being not more than 250 grammes. The former duty on this class was 60 frs.

Soap creams and liquid soaps, imported in receptacles, the aggregate weight of container and contents being more than 250 grammes has been increased by 3 fr. to 33 fr. per 100 kilogs. Medicinal soaps (including medicinal soap in balls, bricks or cakes, and powered medicinal soap) and soaps in balls, bricks or cakes imported in boxes not containing more than three pieces; wrapped soaps and soaps in sheets have been increased by 3 fr. to 43 frs. per 100 kilogs. The term "wrapped soaps" includes toilet soap not coming under the preceding categories, wrapped in metal foil (tin foil, &c.), in goffered, coloured, gilt, silvered or bronzed paper, or in papers having ornaments in relief or printed designs. The duty on articles not specially mentioned has been raised by 3 fr. to 21 frs. per 100 kilogs. Soaps other than scented or toilet soaps have an increased duty of 2 fr., making 8 fr. per 100 kilogs.

* These products are subject to duty without tare allowance for weight of receptacles or packages, such as boxes, cardboard, cases, tubes, bottles, flasks, pots, small bags, paper, tin foil, &c., containing wrapping or protecting the goods.
100 = kilogs = 220·46 lb. avoirdupois.

Pemberton Ansell & Co., Ltd.

In Voluntary Liquidation

A MEETING of creditors of Pemberton Ansell & Co., Ltd., 92, Fleet Street, E.C., and at Bristol, chemical merchants, &c., was held on Friday, July 16, in the Council Chamber of the Society of Incorporated Accountants, Gresham Street, E.C. The shareholders had previously passed the usual resolution in favour of voluntary liquidation and had appointed Mr. T. Davies, 69, Basinghall Street, E.C., liquidator. The statement of affairs showed liabilities amounting to £4,908 6s. 9d., of which £2,695 14s. 11d. was due to creditors for goods supplied and the balance represented claims against the company for various amounts. The net assets were estimated at £2,132 12s. 3d. The statement showed that judgment had been obtained against the company in a consolidated action by the Overseas Trading Co., Trading & Transport Co., and Matthew Kelly & Co. In connection with the action a sum of £306 9s. 4d. was included in the liabilities. An action had also been begun against the company for breach of contract by Palmers, Ltd., in respect of 10 tons of bleaching powder, which had not been taken up, and judgment was obtained for £310 2s. 6d. A similar action had been brought by Collins & Co. in respect of 2,000 cases of candles, in which judgment was obtained against the company for non-delivery, the judgment amounting to £1,500. There was also a claim in respect of goods sold by the company and alleged by the purchasers not to be up to sample. In that direction there was a contingent claim of £1,195 which had not been included in the liabilities. The liquidator had also been notified of probable claims for "difference in market prices" in respect of certain goods ordered by the company and not taken up.

The company was registered on October 1, 1919, with a nominal capital of £5,000, to acquire and take over the business which had been previously carried on in partnership. The purchase price was £1,300, which was satisfied by a cash payment of £100 and the allotment of £1,200 in fully paid shares. The company acquired certain assets, but the major portion of the purchase price represented the goodwill. The company also acquired contracts running into many thousands of pounds, and some had resulted in loss. There were actions pending against the company, in respect of breaches of contracts, by four firms whose claims aggregated £2,000, and in consequence of these actions voluntary liquidation took place. During the present year the company had issued 2,000 shares for cash to two gentlemen who became directors.

After discussing the position a resolution was passed by the creditors in favour of an application being made to the Court for the appointment of Mr. E. H. Hawkins, of Poppleton, Appleby & Hawkins, 4, Charterhouse Square, E.C., as joint liquidator of the company. A committee of five of the principal creditors was also nominated.

Chemical Matters in Parliament

British Farina Mills, Ltd.

MR. W. SHAW asked the Minister of Food (House of Commons, July 15) if the Government has any financial interest in the British Farina Mills, Ltd., which owns the farina mill at Monikie, Forfarshire: if so, would he state the actual amount of public money invested in this concern; and if any contract, or contracts, have been made with potato growers to ensure a supply of raw material for the mill at Monikie?

Sir W. Mitchell-Thomson: The relations between the Government Departments concerned and the British Farina Mills, Ltd., are at present the subject of arbitration, and I cannot at this stage make any statement on the matter.

German Dyestuffs

Sir Robert Horne, in reply to Mr. Hogge (House of Commons, July 19) stated that the total quantity of synthetic dyestuffs, including a small quantity of intermediates, imported from Germany during the first six months of the current year was approximately 387 tons, of which about 150 tons were received under the Reparation Clauses of the Treaty of Versailles.

Motor Fuel

Mr. Newbould asked the President of the Board of Trade (House of Commons, July 19) for what reasons it was not found practicable to take any action in accordance with the recommendations of the Profiteering Sub-Committee on Motor Fuel, except so far as concerned power alcohol?

Sir R. Horne: I cannot go fully into the subject in reply to a question, but the main difficulty, as indicated in the covering letter from the Chairman of the Central Committee, which is printed with the Sub-Committee's Report, is our complete dependence on foreign sources of supply, the price of which we are not in a position to control.

Salt Manufacturers Association

Mr. Entwistle asked the President of the Board of Trade (House of Commons, July 19) whether it is proposed to take any action in view of the finding by a Sub-Committee of the Standing Committee on Trusts that the Salt Manufacturers' Association, directly or indirectly, fix the selling price for 95 per cent. of the salt sold in this country, and that the sudden and marked increase in prices and profits in the year 1916 can only be attributed to the formation of this association?

Sir R. Horne: The Report of the Sub-Committee appointed to investigate salt, in addition to the findings referred to, stated that prior to the formation of the association the prices obtained for salt were barely remunerative. The present situation does not seem to call for action by the Board of Trade, but the course of prices will be watched.

Protection for Synthetic Dye Industry

Replying to Mr. Sugden (House of Commons, July 20), who asked if the Government were still of opinion that the development of the synthetic dye-making industry in the United Kingdom was a matter of great importance; and, if so, whether he was now able to make any statement as to the steps which he proposes to take to assist that development?

Sir R. Horne stated: The experiences of the War made it apparent that the existence of a strong synthetic dye-making industry is a military necessity, and essential to the defence and security of the United Kingdom, and pledges have on several occasions been given that steps would be taken to protect this industry for a time, so as to enable it to be placed on a secure foundation. All the various alternative methods of fostering the industry have been considered, and the opinion of the Government is that assistance can be most effectively given by the prohibition of the importation of synthetic dyestuffs except under licence. An undertaking has already been given to this particular industry that this course will be adopted, and accordingly proposals to that effect will be embodied in a Bill relating to key industries which will be introduced and proceeded with as soon as possible. In carrying out this policy it will be the object of the Government to facilitate the working of the trade as much as possible.

Shell Transport and Trading Co.

Mr. Myers asked the Under-Secretary of State for Foreign Affairs (House of Commons, July 20) whether any of the managing directors of the Shell Transport & Trading Co., Ltd., have any association, either direct or indirect, with the Foreign Office?

Mr. Harmsworth: No, Sir.

Lysle Distributing Agencies

Meetings of Creditors and Shareholders

STATUTORY meetings of creditors and shareholders under the compulsory winding-up order, made against the Lysle Distributing Agencies, Ltd., 9, Gamage Buildings, Holborn Viaduct, E.C., were held on Thursday, July 8, at the Board of Trade Offices, 33, Carey Street, W.C.

Mr. E. T. A. Phillips, Assistant Official Receiver, who presided, reported that the company was registered as a private company in August, 1919, with a nominal capital of £5,000, to acquire and carry on the business of manufacturers of, and dealers in, toilet and medicinal preparations. According to Mr. de Lysle, the business was started early in 1919 by the brothers Wolff, who had in their possession certain formulæ for the manufacture of "Nicodine," "Pyro Dandruff Destroyer," and "Pryotone Tooth Paste." These formulæ were in writing, but they had not yet been traced. The company acquired from Mr. de Lysle the goodwill of the business, together with the stock, plant, machinery and office furniture for £3,998, which was satisfied by the issue of 2,000 £1 shares to Mr. de Lysle, and 1,998 shares to the brothers Wolff. The remaining 1,002 shares were allotted for cash. On October 1, 1919, the company obtained a loan of £500 from Messrs. Konig & Co., bankers, of Cornhill, and as the loan was not repaid at the due date Messrs. Konig obtained judgment, levied execution, and the assets of the company were sold for £207. The failure was attributed by Mr. de Lysle to incompetence and mismanagement on the part of those responsible for running the factory. A statement of the company's affairs showed gross liabilities £3,631. 17s. 8d., of which £3,321. 17s. 8d. was unsecured, and assets valued at £365. 1s. 9d. The total deficiency, including the amount due to shareholders, was returned at £8,141. 15s. 2d.

The liquidation was left in the hands of the Official Receiver.

Sale of "Zotal" in Spain

Judgment for the Plaintiff

On Friday the hearing of this case was resumed.

The Lord Chief Justice by agreement delivered his decision on that part of the issue that was governed by Spanish law, viz., whether the registering of the trade mark Zotal by the plaintiff as his property was legal. The legal evidence he had heard, he said, was to the effect that the rights of a bona-fide purchaser for value of a trade mark were protected by the Spanish law not withstanding that the seller obtained the trade mark by fraud from the original owner. So that if Tehera bought the trade mark for value from Espinar he was protected. But it was also said that if Tehera had carried on nefarious practices by selling a disinfectant other than Zotal under the trade mark Zotal, it was within the province of the defendants to proceed against him in Spain when they could, if they proved their case, have got an injunction against Tehera and obtained the cancellation of their trade mark back. It would have been possible for plaintiff to have taken proceedings to that end, but defendants had not placed him in that position, and the refusal by them to take proceedings in Spain created a breach of the contract with plaintiff. In consequence the only question left to the jury to consider was the amount of damages the plaintiff was entitled to for a breach of contract and whether there had been a libel.

The jury found for the plaintiff for £5,000 damages for breach of contract, and £1,000 damages for libel.

Judgment was entered for £6,000 and costs.

£20,000 for a Chair of Chemistry

APPROXIMATELY £350,000 has been given by Sir Jesse Boot within the last few days to his native city of Nottingham. After announcing his intention of presenting a pleasure park to the city, on which he is prepared to spend £250,000, Sir Jesse has given £50,000 to the Nottingham Hospital, followed by a further £50,000 towards the proposed Nottingham University. Of this last gift £20,000 is to be applied to the endowment of a Chair of Chemistry, with particular view to the furtherance of research. In recognition of his great public spirit it is understood that the city of Nottingham has under consideration a proposal to present its honorary freedom to Sir Jesse.

From Week to Week

Mr. C. O. BANNISTER has been appointed professor of metallurgy at Liverpool University.

Mr. A. A. CAMPBELL SWINTON, F.R.S., has been elected chairman of the Council of the Royal Society of Arts.

In the House of Commons on Tuesday the NAURU ISLAND AGREEMENT BILL, which provides for the acquisition of the large phosphate deposits on the island, was read a third time.

A first consignment of German reparation ALIZARINE DYES, amounting to 200 casks of 4 cwt. each, has been received at Madras.

Dr. F. FRANCIS, professor of chemistry in Bristol University, has been appointed to the office of Pro-Vice-Chancellor of the University.

DR. M. BODENSTEIN, of the Technical High School at Hanover, has been appointed to the chair of physical chemistry in the University of Jena.

Owing to the difficulty of obtaining cargo space in outward-bound steamers, the Canary Islands are experiencing a SHORTAGE OF CHEMICAL MANURE FERTILISERS.

MR. W. M. CUMMING, hitherto of the British Dyestuffs Corporation, has been appointed senior lecturer in organic chemistry at the Royal Technical College, Glasgow.

The death took place at Acton, on Sunday, July 18, of MR. R. F. JAPP, the only surviving son of Dr. F. R. Japp, emeritus professor of chemistry in the University of Aberdeen.

Leeds exports of CHEMICALS, dyes and drugs to the United States during the last three months amounted in value to £28,640, as compared with £91,248 during the first three months of the year.

Among the guests at the dinner to Lord Moulton at the Savoy Hotel on Wednesday evening was Dr. E. K. RIDEAL, who has recently returned from America, and is resuming his academic work in this country.

At a special general meeting of the shareholders of the DOMINION STEEL CORPORATION, held at Halifax, Nova Scotia, on Thursday, July 15, the contract providing for the sale of the corporation to the British Empire Steel Corporation was unanimously accepted.

MR. JOHN MURRAY, M.P., has accepted the appointment of chairman of the Central Committee under the Profiteering Acts, in succession to Mr. C. A. McCurdy, M.P., whose duties as Food Controller do not enable him to spare the time to continue to act as chairman of the Committee.

At a meeting of the Senate of London University on Wednesday the degree of D.Sc. in chemistry was conferred on MR. E. R. TURNER, an internal student, of the East London and Goldsmiths' Colleges, for work carried out for the British Dyes, Ltd., and the Ministry of Munitions.

IT IS ANNOUNCED from Cologne that it is no longer necessary to obtain export permits from the Rhineland Commission, as hitherto prescribed by the occupation authorities, in order to be able to export dyes and other chemical and pharmaceutical products from the occupied districts.

In the removal of restrictions upon IMPORTS INTO AUSTRALIA, a notable exception has been made in the case of dyestuffs, which are still controlled. It is officially stated that this is with the object of encouraging the synthetic chemical industry throughout the Empire.

The death is announced of two eminent German chemists—namely, Professor L. GATTERMANN, professor and director of the Freiburg University Chemical Laboratory, at the age of 60, and FRIEDRICH BAYER, son of the founder of the firm of Fr. Bayer & Co., Leverkusen, and for the last eight years a director of the firm, in his 68th year.

Sheffield University, having decided to appoint a professor in fuel technology, to preside over a department for the investigation of fuel problems and the instruction of students, have appointed DR. R. B. WHEELER to the post. Dr. Wheeler, who is an authority on all matters relating to fuels and the by-products resulting from the manufacture of coal gas, was in charge of the experiments on coal-dust explosions in collieries conducted under the direction of Sir William Garforth at Altofts, near Normanton.

The French *Journal Officiel* for July 5 contains a list of the colouring materials and pharmaceutical and other chemical products the importation of which into France from Germany can only be effected by special licence when the quantity of such products imported is *in excess* of the levy imposed by Annex VI. of the Clauses of the German Peace Treaty relating to Reparations. (Art. 2 of the Law of November 7, 1919.) This list (in French) may be inspected at the Department of Overseas Trade, 35, Old Queen Street, S.W.

A verdict of "accidental death" was returned at the inquest concerning the death of Thomas Donohoe, a 13-year Manchester boy, who died from burns caused by a piece of phosphorus which he had picked up on a recreation ground and placed in his pocket. How the phosphorus had got to the recreation ground is not clear, but its origin was the neighbouring canal, where a flaming tinful had been thrown from the yard of a Manchester chemical company's works. Afterwards a good deal of it was recovered, but some was left within easy reach in shallow water.

The President of the Board of Trade has appointed a Committee consisting of Sir Frank Warner (Chairman), Mr. W. A. Anderson, Mr. P. W. L. Ashley, Sir W. H. Clark, Mr. J. W. Murray, Mr. G. C. Vyle and Major F. H. Wedgwood, to consider the best policy to be adopted as regards BRITISH INDUSTRIES FAIRS, particularly in respect of the centres at which they should be held, the trades which should be included, and the classes of exhibitors who should be allowed to participate. Mr. A. G. Chuter, of the Department of Overseas Trade, has been appointed Secretary to the Committee.

Under the terms of a French Presidential Decree, dated June 30, affecting THE EXPORT OF OIL CAKE, the export of oil cake remains prohibited, except under licence, and it is provided that when such cake is allowed to be exported under licence an export duty is to be levied at the rate of 25 francs per 100 kilogs net weight. From the preamble to the Decree, it appears that, owing to the stocks which have accumulated, it is intended to allow the export of oil cake during the summer months up to amounts to be fixed by the Ministry of Agriculture for each month.

MR. JAMES HAMILTON, who was for many years associated with the Burmah Oil Co., died on Sunday, July 18, at his residence, Langside Road, Newlands, Glasgow. Mr. Hamilton entered the service of the Burmah Oil Co. as a youth. His ability brought him rapid promotion, and he ultimately received the appointment of manager. Recently he relinquished the managership, but retained his position in the directorate, of which he had long been a member. Mr. Hamilton, who devoted himself to the interests of the company throughout his long connection with it, was well known in business circles in the city.

Mr. J. Alexander, one of the foremost chemists of the United States, announces his discovery of a process whereby a CHEAPER AND MORE EFFICIENT FUEL can be manufactured especially for steamships and battleships, than is possessed by the fuel oil now in use. The chemists have taken coal waste and cheap tar, making use of the so-called colloidal method, and the additions of a certain factor whose nature is not yet revealed, probably because it is the purpose, until satisfactory commercial arrangements can be secured, to maintain it as a secret process.

The first meeting in London of the Executive Council of the Chemical and Dyestuffs Traders' Association was held on Wednesday at the new offices, 22, Buckingham Gate, S.W.1, under the presidency of Mr. F. T. T. Reynolds. The meeting was largely occupied with the consideration of questions of general policy affecting the merchant interest, and with arrangements for co-operating with kindred associations. The recent announcement of the Association's establishment had brought in a number of applications for membership, and the new members selected, with the original promoters, already constitute an influential body. In view of the appointment of permanent joint secretaries, Mr. A. F. Butler, of Manchester, who had hitherto acted as hon. secretary, relinquished the post. His services in the formation of the Association were warmly recognised, and it was intimated that they would be recognised in a tangible form at a later stage. It was announced that general satisfaction had been expressed at the movement for establishing an Association of merchants, and that the Association promised to meet a long-felt want.

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PROTEINS. Preparation of pure proteins. E. Herzfeld and R. Klinger. *Biochem. Zeits.*, February 28, 89-97.

SULPHURIC ACID. Critical observations on the high-concentration of sulphuric acid. K. Mattenklodt. *Chem. Zeit.*, July 17, 529.

Patent Literature

Abstracts of Complete Specifications

124,194. ACETALDEHYDE, PARALDEHYDE, ACETIC ACID, ETHYL ALCOHOL. Soc. des Acieries et Forges de Firminy, Firminy, Loire, France. International Convention date, March 13, 1918.

Acetylene is passed through dilute sulphuric acid containing mercury sulphate and small quantities of ferric and vanadium sulphates, the temperature being maintained at 65°C. The mixture of acetylene and aldehyde vapour is treated with sulphuric acid of 15-20 per cent. strength, and the resulting paraldehyde is separated and then de-polymerised by boiling in dilute sulphuric acid. Acetic acid may be produced from the aldehyde vapour by treating it with air or oxygen with the aid of a copper permanganate catalyst. The mercury catalyst may be regenerated by electrolytic oxidation.

125,584. AROMATIC UREAS. A. V. Blom, 53, Laupenstrasse, Bern. International Convention date, April 17, 1918.

A mixture of equimolecular parts of an amidonaphthol sulphonic acid and an aromatic diamine with an agent which neutralises hydrochloric acid, *e.g.*, alkali or carbonate, is treated with phosgene gas at 40°C. to produce asymmetric ureas. The aromatic diamine must contain two primary amido groups having different reaction speeds; either one must be protected by an *o* substituent, or a hydrogen of one of the amido groups must be substituted directly by a formyl group. Many examples are given.

144,751. HYDROGEN, MANUFACTURE OR PRODUCTION OF. The British Oxygen Co., Ltd., Elverton Street, Westminster; S. W. Bray, 16, Laking Street, Lightbowne, Manchester; and I. H. Balfour, "Elsemere," Buckhurst Hill, Essex. Application date, February 14, 1919.

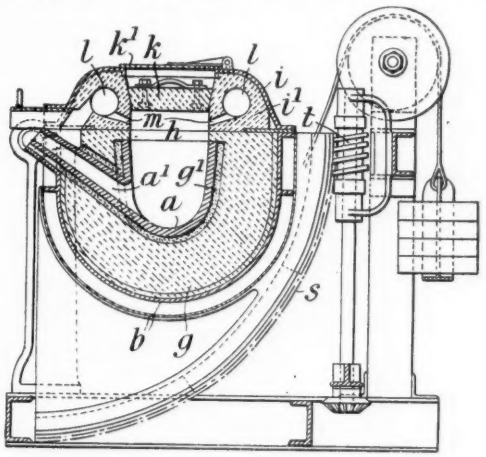
In apparatus for the manufacture of hydrogen by the steam-iron process the iron oxide which is formed must be periodically reduced by means of water gas. The reducing reaction is reversible at the retort temperatures, so that the gas leaving the retorts always contains a proportion of unused hydrogen and carbon monoxide. The object is to utilise these gases. The spent gas is passed through a scrubber where it is washed with water to remove sulphur compounds, then through a potash solution to remove carbon dioxide, and finally through a tubular condenser to remove water vapour. The gas is then passed directly into another hydrogen unit containing a charge of oxidised iron and the fresh material extracts the remainder of the carbon monoxide and hydrogen. This unit containing the partly reduced iron oxide is then treated with fresh water gas to complete the process. A third unit may be used simultaneously for generating hydrogen and the process may then be made cyclic, each unit passing in turn through all stages of the process.

144,815. ROTARY FURNACES, RETORTS AND THE LIKE. E. H. Summers, Throstle Nest, Weston Road, Gloucester, and E. S. Whittard, Montserrat House, Rodboro Common, near Stroud, Gloucestershire. Application date, March 21, 1919.

The retort is of the type which is positively driven at or near both ends. The drive is transmitted from a parallel longitudinal shaft through two transverse worm shafts to two worm wheels encircling the retort. In order to permit longitudinal expansion of the retort one of the wheels is adapted to slide axially on it, but is not rotatable relatively to the retort.

144,802. ELECTRICALLY-HEATED FURNACES. The Morgan Crucible Co., Ltd., and C. W. Speirs, Battersea Works, Battersea, London. Application date, March 17, 1919.

The furnace is for electrically heating metals, ores, or other materials in a crucible. The crucible *a*, which is shown in vertical cross-section, is in the form of an elongated trough provided with a spout *a'* at the centre of one side and having terminals for the electric conductors at each end, these terminals being water cooled. The crucible is mounted in a casing *b* of considerably larger section, the intermediate space *g* being filled with a heat insulating material. The casing extends above the crucible *a* so as to provide a space *h* for bulky material which is being melted. An upper casing *i* having a lining of refractory material *i'* contains a cover *k* and an outer lid *k'*. Longitudinal flues *l* in the lining communicate through passages *m* with the preheating space *h* and may be connected with an exhaust fan to remove any gases evolved. The casing may be mounted on trunnions so that it may be tipped by means of a worm *t* and toothed sector *s*. To



144,802

allow for expansion and contraction of the crucible *a* it may be bedded upon a layer *g'* of soot or sand, and insulating collars are provided at the two ends of the crucible to prevent admission of air. The two ends of the crucible are made cylindrical or conical, so that water-cooled connecting rings may be clipped on to them.

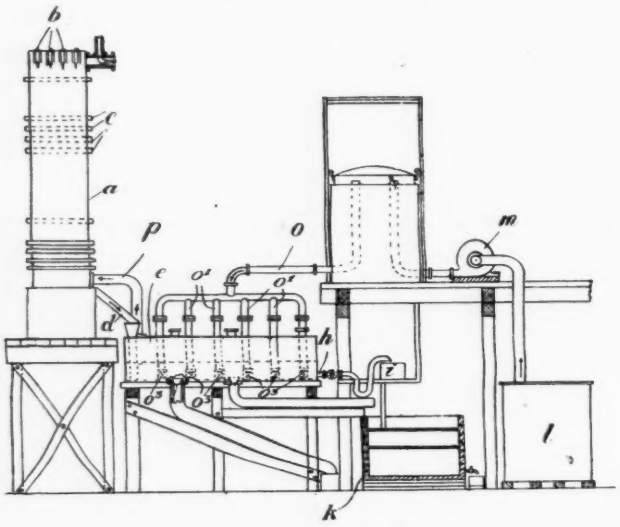
144,819. LEAD SALTS, METHOD OF AND APPARATUS FOR PRODUCING. W. J. Mellersh-Jackson, London. (From E. A. Sperry, 1505, Albemarle Road, Brooklyn, New York.) Application date, March 21, 1919.

The process is for making lead salts, such as the chromate sulphate or carbonate, by an electrolytic method. The electrolytic cell contains a cathode of iron, copper, or other metal in a porous cathode cell of parchment while the anode is a lead plate in the outer container. The anolyte is an alkali salt, such as sodium acetate, which is capable of yielding a lead solvent, while the catholyte is the same salt mixed with sodium carbonate or bicarbonate. The anolyte is circulated by a pump from the bottom of the cell to a settling tank and then back to the top of the cell. The catholyte is circulated by another pump from the top of its compartment to the top of a carbonating tower where it meets a current of carbon-dioxide passing upwards, and then passes back to the bottom of the cathode compartment. The sodium acetate reacts with the lead plate forming lead acetate, while the sodium liberated at the cathode reacts with water to form caustic soda which is converted into sodium carbonate in the carbonating tower. The sodium carbonate thus formed passes through the porous walls into the anode chamber, where it reacts with the lead acetate, to precipitate white lead with the formation of sodium acetate, so that the process is cyclic. The only materials consumed are water, lead and carbon dioxide. To produce white lead of a quality similar to that produced by the "Dutch process" both large and small particles must be produced. This is effected by regulating the amount of carbon dioxide absorbed by the catholyte by regulating the circulation of the latter. The proper combination of lead carbonate and hydroxide may thus be secured.

144,869. SULPHURIC ACID, PROCESS AND APPARATUS FOR THE REMOVAL OF ARSENIC FROM. G. E. Clark, 108, Nile Street, Gateshead-on-Tyne. Application date, May 29, 1919.

The process is of the type in which the acid is treated with sulphuretted hydrogen. The acid is supplied to nozzles *b* at

the top of a tower *a* and is sprayed on to a number of baffles *c*, which cause it to travel downwards in a tortuous path. The acid then passes through a pipe *d* to a sealed tank *e*, provided with a series of vertical baffle plates projecting from each side alternately. The acid passes out through a pipe *h* to a trapped overflow which maintains the level in the tank constant and thence to a receiver *i* and filtering tank *k*. Sulphuretted hydrogen is produced by the action of dilute sulphuric acid on iron sulphide in a generator *l* and is delivered by a fan *m* to a gas holder *n*, from which it passes through a pipe o^3 to the



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tank *e*. The pipe *o* is provided with a number of branch pipes *o'*, each of which terminates in a perforated nozzle *o* at the bottom of the compartments formed by the vertical baffles. The arsenic is thus precipitated in the tank *e* and the residual gas which is partly spent passes through the pipe *p* into the bottom of the tower *a* and then upwards through this tower where it meets the fresh descending acid, which is thus subjected to a preliminary de-arsenicating treatment. The process is thus continuous and the gas is fully utilised.

144,897. CARBOXYL GROUPS, PROCESS FOR THE ELIMINATION OF. J. E. Marsh, The University Chemical Laboratories, Oxford. Application date, July 14, 1919.

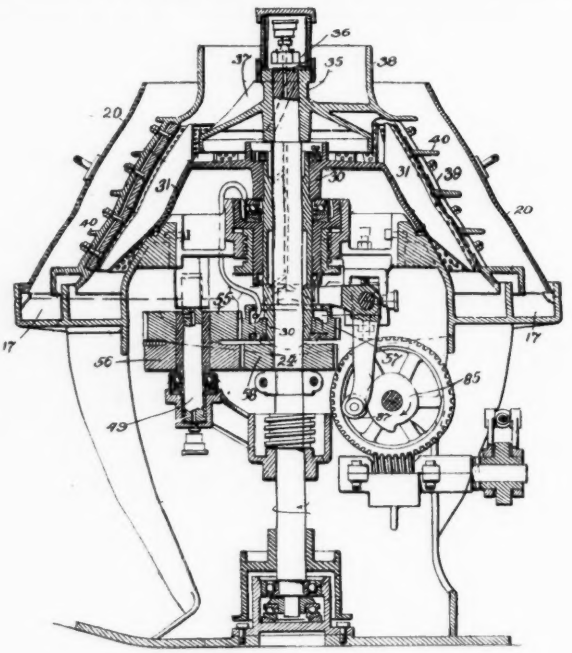
The process is for eliminating the carboxyl group from aromatic organic acids, more particularly for producing phenols such as pyrogallol from hydroxy-acids such as gallic acid, and the object is to obtain a quantitative yield of the desired product. Gallic acid mixed with half its weight of dry sodium chloride is treated in a vacuum still at a temperature of 250°C. and a pressure of 15 mm. Pyrogallic acid distils over and requires no further purification. Preliminary drying of the gallic acid is not necessary since the water distils over at a lower temperature than the pyrogallol and is thus removed. A yield of 95 per cent. of the theoretical amount is readily obtained.

144,961. FILTRATION MEMBRANES, PROCESS OF TREATING. J. F. Wait, 67, North Street, Buffalo, N.Y., U.S.A. Application date, December 2, 1919.

The object is to prepare a colloidal membrane for use in filtering, in succession, liquids which are non-miscible with one another. To prepare a colloidal membrane such as a collodion membrane, when the membrane has solidified but not dried, it is soaked in a medium which is miscible with water and with the liquid to be filtered. If a coal-tar or petroleum derivative or a homologue is to be filtered, an alcohol or ketone or a derivative or homologue of either is used as the soaking medium and will displace the water. In this condition the membrane will filter the desired liquid. If the liquid to be filtered is gasolene, the membrane is treated with alcohol and benzol in succession, the first mixing more readily with water than the second, and the second more readily with gasolene than the first. A similar treatment may be applied to a colloidal metallic membrane to remove moisture. If the membrane is required to be used to filter two non-miscible liquids in succession, *e.g.*, liquid containing water followed by coal-tar derivative, it is first subjected to an alcohol or ketone to displace the water, and then to the coal-tar liquid which displaces the contained alcohol or ketone.

144,979. CENTRIFUGAL DRYERS. G. H. Elmore, Swarthmore, Del., U.S.A. Application date, February 6, 1920.

The object is to produce a centrifugal dryer capable of continuous operation even when the material tends to cake on the screen element of the dryer. A vertical shaft 24 carries at its upper end a hub member 35, secured by a nut 36. The hub member is provided with helical blades 37, an upwardly extending rim 38 forming a receiving hopper, and a conical grating structure comprising bars 39, with connecting annular flanges 40. The drying screen consists of foraminous material applied to the inner sides of the bars 39 and clamped in position. A bell-shaped shell 31 provided on its outer face with a number of helical blades is mounted within the screen structure and is adapted to convey downwards the material supplied to the hopper 38. The shell 31 is mounted on a sleeve shaft 30, which is driven by the shaft 24 through a gear wheel 58 and two gear wheels 55, 56 of slightly different sizes, mounted on a pin 49; the gear wheel 55 meshes with another



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wheel 57, carried by the shaft 30. The ratio of the gears is such that the shaft 30 and shell 31 are driven at a slightly slower speed than the shaft 24 and the foraminous screen. The granular material fed into the hopper 38 is thrown against the screen, but the centrifugal force is not sufficient to feed it down the screen; this feed is effected by the helical blades on the shell 31. The extracted water passes through the screen and is deflected by the cover 20 into the launder 17. The dried granular material flows downwards to another outlet. A layer of granular material accumulates on the screen and acts as a filter, and to prevent clogging is periodically removed by lifting the shell 31 slightly. This is effected by means of a slowly rotating cam 85, which pe iodically actuates the roller 87 of a bell crank lever which lifts the shaft 30. The frequency of this lifting action is varied by driving the mechanism through a variable gear. After the shell 31 falls, a new layer of granular material forms to act as a filter.

144,989. ENRICHMENT OF PRODUCER GAS, PROCESS FOR. C. Griffin, Gas Works, Shefford, Bedfordshire. Application date, April 15, 1920.

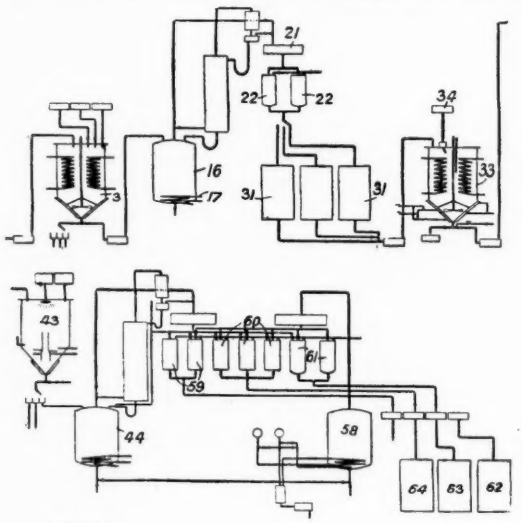
Producer gas is enriched by mixing it with gas obtained by injecting tar into one or more of the retorts.

NOTE.—The following specifications, which are now accepted, were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 126,614 (C. H. Smith), relating to furnace retorts; 131,272 (Dorr Co.), relating to caustic soda from pulp digestion residues; and 141,661 (T. A. Clayton), relating to manufacture of sulphur dioxide and trioxide. *See* Vol. I., page 176, Vol. I., page 530, and Vol. II., page 699, respectively.

International Specifications Not yet Accepted

142,806. SYNTHETIC RESINS. Barrett Co., 17, Battery Place, New York. (Assignees of C. M. Dennis, Ithaca, New York.) International Convention date, May 5, 1919.

Resins are produced from solvent naphthas or heavy benzols by acid polymerisation of the cumarone, indene, &c. The crude naphtha is first treated in a tank 3 with soda solution to remove phenols and with dilute acid to remove pyridine, and subjected to preliminary polymerisation with sulphuric acid containing 0·1 to 0·5 per cent. of acid of 60 to 66°Bé. to remove dark-coloured constituents. The tank 3 is provided with a stirrer and cooling coils. The oil is then neutralised and transferred to a still 16 where it is distilled under vacuum by a steam coil 17. The vapour is condensed in a condenser



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21, and the distillate passes thence to receivers 22 and storage tanks 31. The main polymerisation takes place in the vessel 33, which is similar to the vessel 3, the acid being supplied from a tank 34; the acid should contain 1 to 3 per cent. of about 62°Bé. The polymerised oil then passes to a settling tank 43, where the spent acid and tar are removed, and the oil is neutralised with soda and washed with water. The oil then passes to another still 44 and the naphthas distilled off are condensed in condensers 59, 60, 61. The liquid residue passes to a still 58 for a final distillation, the heavy oils also passing to the condensers 59, 60, 61, and the molten resin remains in the bottom of the still. The distillates are collected in the tanks 62, 63, 64.

142,836. ELECTRIC FURNACES. C. Soncini, Pont St. Martin, Italy. International Convention date, April 25, 1919.

The crucible is embedded in a casing containing insulating material, and a number of separate recesses are formed in the casing adjacent to the crucible but separated from one another. These are filled with resistance material which is separated from the crucilbe by a thin lining of non-conducting material, and the separate resistances may be connected in series, in parallel, or in series-parallel sets. A water-cooled terminal block is adjustably pressed on the top of the resistance material, which rests on similar terminal blocks at the bottom. The crucible is provided with a pouring spout, and the whole furnace is mounted on horizontal trunnions.

142,854. LEAD AND SILVER CHLORIDES. Amalgamated Zinc (De Bavay's), Ltd., 360, Collins Street, Melbourne. International Convention date, May 6, 1919.

Complex sulphide ores containing lead, silver and zinc are mixed with hydrochloric acid, dried below 100°C., and then heated to 500°-600°C. in a closed vessel. The mixture may be moistened and then left for some time, and then leached with hot brine containing ferric chloride. The lead and silver chlorides are then dissolved with a minimum time of contact between the ore and the leaching solution.

142,859. PURIFYING GASOLENE. De Laval Separator Co., New York. (Assignees of M. Leitch, Kingwood Park, Poughkeepsie, N.Y., U.S.A.) International Convention date, September 23, 1918.

Gasolene is agitated with caustic soda solution and the resulting emulsion is centrifuged before any settlement takes place.

142,865. TREATING BONES. U. Busico, Vinchiaturo, Campobasso, Italy. International Convention date, March 11, 1919.

Pulverised bones are treated with a solution of sulphurous acid or a sulphite, and the calcium phosphate is dissolved. The fat separates into a surface layer and the unchanged ossein remains at the bottom. Lime water is then added to the solution and crystalline calcium phosphate is precipitated. The remaining soluble calcium salts may be used for treating a further quantity of bones.

LATEST NOTIFICATIONS.

146,333. Simultaneous production of caustic soda and hydrochloric acid. Bonneau, C., and Aragay, J.M. January 30, 1919.
146,407. Nickel catalyst. Teichner, G. November 10, 1916.
146,409. Centrifugal pumps for acids. Chemische Fabriken vorm Weiler-Ter-Meer. November 19, 1917.
146,410. Zinc sulphide. Clerc, C. May 20, 1919.
146,411. Fumaric acid. Wehmer, C. September 28, 1915.
146,427. Tanning preparations, Manufacture and production of. Badische Anilin & Soda-Fabrik. February 19, 1919.
146,455. Conversion of cellulose-containing materials into soluble carbo-hydrates. Wohl, A. March 14, 1917.
146,498. Artificial resins. Badische Anilin & Soda-Fabrik. June 13, 1919.
146,819. Cyanides, Synthetic. Mitsubishi Kogyo Kabushiki Kaisha. July 7, 1919.
146,860. Saccharification of cellulose containing materials. Wohl, A. April 7, 1917.
146,869. Glycerine and like substances, Purifying. Elektro-Osmose Akt.-Ges. January 17, 1919.
146,869. Pyridine bases. Farbwerke vorm. Meister, Lucius & Brüning. June 22, 1917.
146,870. Arseno-compounds of the pyrazolone series. Farbwerke vorm. Meister, Lucius and Brüning. December 15, 1917.
146,871. Mono-azo-dyestuffs for dyeing wool. Farbwerke vorm. Meister, Lucius & Brüning. June 30, 1914.
146,872. Substantive azo-dyestuffs. Farbwerke vorm. Meister, Lucius & Brüning. April 23, 1914.
146,956. Alcohols, esters and the like from still gases of petroleum. Hunt, S. B. March 20, 1917.
146,957. Reactive acid liquor alcohols, esters and the like from gaseous hydro-carbons. Hunt, S. B. March 11, 1919.
147,000. Pyridine bases. Farbwerke vorm. Meister, Lucius & Brüning. Aug. 30, 1918.
147,001. Anthraquinone derivatives. Farbwerke vorm. Meister, Lucius & Brüning. July 11, 1918.
147,020. Removal of dust from the gases derived from the roasting of ores. Manufacture de Produits Chimiques du Nord, Etablissements Kuhlmann. May 6, 1914.

Specifications Accepted, with Date of Application

125,391. Electric furnaces. R. Steiger. April 8, 1918.
132,232. Electric furnaces. E. Piquerez. September 2, 1918.
132,266. Crucible and like furnaces. J. A. Gaskill. September 3, 1918.
134,531. Alumina, Method of producing. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. October 26, 1918.
145,818. Petroleum oils, Purification of. J. J. Hood. February 24, 1919.
145,824. Cyanogen and ammonia, Method of producing. R. L. Goold. (*Balfour-Guthrie Investment Co.*) March 25, 1919.
145,852. Ores, Concentration of. L. A. Wood and Minerals Separation, Ltd. March 29, 1919.

145,856. Coal gas, Apparatus for washing and scrubbing. F. G. Brockway. March 31, 1919.
145,870. Ores, Concentration of—and apparatus therefor. Minerals Separation, Ltd. (*E. H. Emerson.*) April 1, 1919.
145,871. Protocatechuic aldehyde, Manufacture of. Confectionery Ingredients, Ltd., F. E. Matthews, A. T. King and T. Kane. April 1, 1919.
145,873. Gas producers. Sir H. H. Spicer (*J. F. Wells.*) April 1, 1919.
145,894. Oil, Process of refining, by distillation. C. B. Forward. April 5, 1919.
145,906. Hydrocarbons from coal or other carbonaceous matter, Process and apparatus for extracting. W. D. Rock. April 16, 1919.
145,947. Enriched water gas, Process and apparatus for producing —and the products and by-products of such process. J. W. Gibson and R. L. Wyman. May 30, 1919.
146,020. Open-hearth furnaces. D. McLain and F. Carter. October 10, 1919.
146,058. Continuous stills for the dissociation of chemical solutions by heat. R. Fabry. February 10, 1920.

Applications for Patents

Badische Anilin & Soda-Fabrik. Manufacture of artificial resins. 21,151. July 13.
Berkerson, Ltd. Effecting recovery or separation of colloidal matter from liquids. 21,363. July 15.
British Glues & Chemicals, Ltd. Production of fertilisers. 21,006. July 12.
Byrnes, C. P. Method of separating aldehyde fatty acids from congeneric substances, and manufacture of soaps from these acids. 21,291. July 14.
Casale, L. Process for preparing nitrogen or nitrogen and hydrogen mixtures. 20,706. July 10. (Italy, July 12, 1919.)
Chemische Fabriken Worms Akt.-Ges. Manufacture of tanning agents. 20,720. July 10. (Germany, August 17, 1916.) 20,721. July 10. (Germany, August 24, 1916.)
Deutsche Erdol Akt.-Ges. Converting hydrocarbons into fatty acids. 20,715. July 10. (Germany, July 12, 1919.)
Etablissements Poulenc Frères. Dichlorides of monoarylarsines. 20,398. July 10.
Farbwerke vorm. Meister, Lucius, & Brüning. Manufacture of substantive azo dye-stuffs. 18,761. July 5. (Germany, April 23, 1914.)
,, Manufacture of pyridine bases. 18,943. July 6. (Germany, August 30, 1918.)
,, Manufacture of anthraquinone derivatives. 18,944. July 6. (Germany, July 11, 1918.)
,, Manufacture of pyridine bases. 19,128. July 7. (Germany, December 23, 1918.)
,, Process of printing with insoluble dye-stuffs. 19,129. July 7. (Germany, January 15, 1919.)
,, Manufacture of anthraquinone derivatives. 19,519. July 8. (Germany, March 11.)
,, Process of printing with dyestuffs. 21,295. July 14. (Germany, August 23, 1919.)
Goldschmidt Akt.-Ges., T. Production of ethylene chloride. 19,962. July 9. (Germany, May 22, 1915.)
,, Production of ethylene chloride. 19,963. July 9. (Germany, February 29, 1916.)
Granicshstädten, A. Hydration and production of catalysts. 19,511. July 8. (Austria, July 7, 1917.)
Green, A. G. Manufacture of phthalic acid and phthalic anhydride, and catalyst for use therein. 19,210. July 7.
Grob, W. Manufacture of nitrogen containing additions and condensation products from acetylene and ammonia. 19,039. July 6. (Germany, November 20, 1913.)
Grunstein, N. Manufacture of butyric aldehyde and butyl alcohol from crotonic aldehyde. 19,152. July 7. (Switzerland, January 4, 1919.)
,, Manufacture of aldol from acetaldehyde. 19,153. July 7. (Switzerland, March 18, 1919.)
Hunt, S. B. Production of alcohols, esters, &c., from still gases of petroleum. 18,855. July 6. (United States, March 20, 1917.)
,, Production of alcohols, esters, &c., from gaseous hydrocarbons. 18,856. July 6. (United States, March 11, 1919.)
Imray, O. (*Soc. of Chemical Industry in Basle.*) Manufacture of aralkyl esters of 2-phenylquinoline-4-carboxylic acid. 18,756. July 5.
Jaubert, G. F. Manufacture of hydrogen. 19,483. July 8. (France March 9, 1918.)
Kersten, J. Decomposition of alkali chlorides. 19,459. July 8. (Germany, May 10, 1916.)
Krupp, Akt.-Ges., F. Apparatus for opening up, conveying and disintegrating superphosphate, &c. 19,173. July 7. (Germany, July 28, 1915.)
Legg, D. A. Apparatus for catalytic, &c., reactions. 21,258. July 14
Matter, O. Production of polyvalent alcohols. 19,960. July 9. (Germany, December 8, 1913.)
,, Production of polyvalent alcohols. 19,961. July 9. (Germany, April 21, 1915.)
,, Production of ethylene chloride. 19,962. July 9. (Germany, May 22, 1915.)
Mitsubichi Kogyo Kabushiki Kaisha. Synthetic method of producing cyanides. 18,674. July 5. (Japan, July 7, 1919.)
Müller Speisefeltfabrik Akt.-Ges., C. & G. Production of metallic non-pyrophoric catalysts. 20,010. July 9. (Germany, February 6, 1919.)
Napier, O. J. W. Manufacture of phthalic acid and phthalic anhydride, and catalyst for use therein. 19,210. July 7.
Oechslin, K. Dichlorides of monoarylarsines. 20,398. July 10.
Porter, J. W. Manufacture of phthalic acid and phthalic anhydride, and catalyst for use therein. 19,210. July 7.
Rickets, W. J. Electrically inducing chemical action. 18,627. July 5.
,, Electrically inducing chemical action. 19,549. July 8.
Riedel, A. Recovery of nitrogen compounds from coal, &c. 20,603. July 10. (Germany, November 8, 1915.)
,, Manufacture of compounds of nitrogen. 20,604. July 10. (Germany, November 20, 1915.)
Manufacture of coke for blast furnaces. 20,605. July 10. (Germany, January 3, 1916.)
,, Recovery of ammonium chloride from fuel. 20,606. July 10. (Germany, February 29, 1916.)
,, Recovery of nitrogen from fuel. 20,607. July 10. (Germany, February 29, 1916.) 20,608. July 10. (Germany, July 16, 1917.)
Riedel, F. Utilising impure, &c., gases containing carbonic acid. 20,922. July 12. (Germany, November 24, 1917.)
Schroeter, G. Hydrogenation of naphthalene. 19,394. July 8. (Germany, February 24, 1915.) 19,409. July 8. (Germany, December 7, 1915.) 19,149. July 8. (Germany, May 13, 1916.) 19514. July 8. (Germany, August 1, 1916.) 19,750. July 8. (Germany, August 1. 1916.)
Simon, J. Chloridising roasting of burnt pyrites. 21,033. July 12. (Germany, August 2, 1917.)
Smeu, V. Apparatus for dissolving, &c., materials with acids, &c. 20,025. July 9. (Austria, December 20, 1915.)
,, Machine for nitrating, &c. 20,026. July 9. (Hungary, November 18, 1916.)
Soc. Chimique des Usines du Rhone, anciennement Gilliard, P. Monnet, et Cartier. Manufacture of oxyaldehydes, &c. 19202. July 7.
Soc. of Chemical Industry in Basle. Manufacture of esters of 2-phenylquinoline-4-carbolyic acid. 18,756. July 5.
Soc. of Chemical Industry in Basle. Manufacture of an explosive. 21,293. July 14.
Sonneck, A. Manufacture of sulphuric acid. 18,746. July 5.
Staehling, C. Manufacture of alkali metals. 20,023. July 9. (France, November 5, 1913.)
Still, C. [Firm of]. Method of treating crude gas liquor to obtain ammonia solution. 19,126. July 7. (Germany, December 6, 1915.)
,, Recovery of ammonia from products of distillation of coal, &c. 19,739. July 8. (Germany, December 3, 1915.)
Strache, H. Preparation of acids from petroleum, &c. 19,958. July 9. (Austria, January 20, 1917.)
Stuer, B. C. Manufacture of nitrogen containing additions and condensation products from acetylene and ammonia. 19,039. July 6. (Germany, November 20, 1913.)
Sudfeldt & Co. Process for obtaining salts of sulpho-acids and alkyl-sulphuric acids from acid resins. 20,584. July 10. (Germany, March 14, 1919.)
,, Process for obtaining sulpho-acids from brown coal-tar oils. 20,585. July 10. (Germany, March 14, 1919.)
Tetralin Ges. Hydrogenation of naphthalene. 19,514. July 8. (Germany, August 1, 1916.)
,, Hydrogenation of naphthalene. 19,750. July 8. (Germany, August 1, 1916.)
,, Production of tetrahydro-β-naphthol and tetrahydro-β-thionaphthol. 20,353. July 10. (Germany, May 18, 1916.)
,, Production of ar-1-tetrahydronaphtha lenesulphonic acid, &c. 20,366. July 10. (Germany, February 25, 1919.)
,, Production of nitro-compounds of tetrahydronaphthalene, &c. 20,751. July 10. (Germany, March 17, 1916.)
Unione Italiana fra Consumatori e Fabricani de Concimi e Prodott Chimici. Manufacture of sulphuric acid. 18,746. July 5.
Verein Chemischer Fabriken Mannheim. Manufacture of hydrofluoric acid from natural fluorides. 19,704. July 8. (Germany, December 27, 1918.)
,, Manufacture of sulphur dioxide. 19,705. July 8. (Germany, August 8, 1919.)
Westling, E. H. Production of manganese dioxide. 18,979. July 6, (United States, March 14, 1918.)

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, July 22.

There has been a decided improvement in the volume of business passing during the current week, and generally speaking, all the indications would point to a steady improvement in the trade situation.

Enquiry is more active, and it is evident that a number of consumers who have recently been restricting their buying are at last being compelled to cover their more immediate requirements. The export demand remains quite satisfactory, without anything of special feature to report.

The selling pressure from America is not quite so great, and a firmer tendency appears to be in evidence in that market.

General Chemicals

ACETONE is passing steadily into consumption at unchanged prices.

ACID ACETIC is in good demand and parcels available for early delivery are being rapidly absorbed. The price is firmer on the week.

ACID CARBOLIC is a weak market, and price is inclined to sag.

ACID CITRIC is still declining owing to the absence of inquiry.

ACID FORMIC is moderately active at last quoted figures.

ACID OXALIC is again steady at recently revised prices, and quite a fair volume of business is reported for spot and near delivery.

ACID TARTARIC is without change in price, and the material does not appear to be quite so freely offered.

AMMONIUM SALTS are without change in value, and are in steady demand.

ARSENIC.—Home production is very firm in price, but, as previously reported, parcels of foreign material are offered at lower figures.

BARIUM SALTS are very quiet and the absence of demand favours the development of easier conditions. There are one or two heavy export inquiries in the market, however, which will help the situation if business results.

COPPER SULPHATE is lifeless and without feature, and the price is naturally extremely weak.

FORMALDEHYDE is a little easier for prompt delivery, owing to the arrival of some parcels from abroad, but on the other hand these are being absorbed quite readily, and we should not be surprised to see prices go higher again.

LEAD SALTS.—The market is decidedly healthier owing to the improved position of the metal, but little improvement in the demand can so far be detected. Stocks are on the light side, however, and when business is resumed at normal rates, we shall quickly see developments. There is some little inquiry from India for Sugar of Lead, but little business has so far resulted.

LITHOPONE is slightly easier on account of increased foreign offerings and lack of any consistent buying.

POTASSIUM BICHROMATE is not quite so active, and the price for export parcels may be taken as being a shade easier.

POTASSIUM PERMANGANATE is without feature and remains in quiet demand at recent values.

POTASSIUM PRUSSIATE.—There are still a few parcels of foreign make offering at recent quotations, and the available quantity is very small, but the general tendency is firmer.

SODIUM ACETATE has been in rather better demand, but is without change in price.

SODIUM BICHROMATE has been more freely offered in second hands, and the price is easier.

SODIUM CAUSTIC is very firm and large premiums are still being paid on export account. It is reported that Germany is again buying this material.

SODIUM HYPOSULPHITE continues scarce, but it is difficult to see from whence relief is to come.

SODIUM NITRITE is only a quiet market, but the price remains very firm.

SODIUM PRUSSIATE is in better demand, but not sufficient to prevent the price from sagging still further.

SODIUM SULPHIDE is as scarce as ever and re-sale parcels are eagerly snapped up for export.

ZINC SALTS are without feature, but there has been an improvement in the demand for Chloride.

Coal Tar Intermediates

The market is perhaps not quite so active, but business continues to move along very satisfactorily, and most works are fully engaged.

ANILINE OIL and SALT are continuing in demand, without change in price.

BENZIDINE BASE is still wanted, but practically nothing is possible for early delivery.

BETA NAPHTHOL is perhaps in slightly better supply, but many parcels are offered in second hands without actual existence in fact, or else consist of duplicated offers. Supplies in the hands of regular suppliers continue extremely scarce.

DIMETHYLANILINE has been rather active, and good business has been done for forward delivery.

DIPHENYLAMINE is in fair request, without change in value.

NAPHTHIONATE OF SODA.—Some good contracts have been booked during the last few days for this material, at full figures.

PARANITRANILINE is without feature, with the demand fully consistent with the price as firm as ever.

Coal Tar Products

There is no change in our market since last week.

BENZOL 90 PER CENT. is worth 3s. on rails.

PURE BENZOL.—The price is still 3s. 3d. to 3s. 4d. per gallon.

CREOSOTE OIL.—Remains firm at 1s. 1d. on rails in the North, and 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID.—Remains stationary at 4s. 6d. to 4s. 9d. per gallon for Pale 97/99 per cent. quality, and 4s. for Dark 95/97 per cent.

SOLVENT NAPHTHA is quoted 3s. 3d. per gallon, but little business is being done.

HEAVY NAPHTHA is still about 3s. 6d. per gallon and supplies are difficult to obtain.

NAPHTHALENE.—Remains steady at £16 to £20 per ton for Crude, Refined being worth £45 to £50 per ton.

PITCH.—There is no change in the position.

Sulphate of Ammonia

Home trade orders are still coming in satisfactorily, and the demand for export remains stationary.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	3	9	to	0	4	0
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	125	0	0
Acid, Acetic, glacial, 99-100%	ton	110	0	0	to	115	0	0
Acetic, 80% pure	ton	90	0	0	to	92	10	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	2	to	0	1	2½
Citric	lb.	0	5	3	to	0	5	6
Fluoric	lb.	0	0	7½	to	0	0	8
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.		8	6	to	0	8	9
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	60	0	0	to	62	0	0
Lactic, 60 vol.	ton	72	10	0	to	75	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	5	to	0	2	6

	per	£	s.	d.		£	s.	d.
Acid, Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	6	to	0	2	8
Salicylic, B.P.	lb.	0	3	3	to	0	3	6
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	5	0	to	0	5	3
Tartaric	lb.	0	3	9	to	0	3	10
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	45	0	0	to	50	0	0
Ammonia, .920	ton	32	10	0	to	37	10	0
Ammonia, carbonate	lb.	0	0	7½	to		—	
Ammonia, chloride	ton	105	0	0	to	110	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	65	0	0	to	70	0	0
Ammonia, phosphate	ton	130	0	0	to	135	0	0
Ammonia, sulphocyanide	lb.	0	2	9	to	0	3	0
Amyl, acetate	ton	410	0	0	to	420	0	0
Arsenic, white, powdered	ton	73	0	0	to	75	0	0
Barium, carbonate, 92-94%	ton	13	10	0	to	14	0	0
Barium, chlorate	lb.	0	1	0	to	0	1	1
Chloride	ton	32	0	0	to	34	0	0
Nitrate	ton	55	0	0	to	56	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Sulphocyanide, 95%	ton		—		to		—	
Bleaching powder, 35-37%	ton	18	0	0	to		—	
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
,, Grey	ton	35	0	0	to	37	10	0
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	9	10	0	to	10	10	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	80	0	0	to	83	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	8	0	to	0	8	3
Oxide, black	lb.	0	10	0	to	0	10	3
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	41	0	0	to	42	0	0
Cream Tartar, 98-100%	ton	290	0	0	to	295	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	345	0	0	to	350	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	15	0	to	5	0	0
Lead acetate, white	ton	90	0	0	to	92	10	0
Carbonate (White Lead)	ton	70	0	0	to	72	10	0
Nitrate	ton	72	0	0	to	75	0	0
Litharge	ton	62	10	0	to	65	0	0
Lithopone, 30%	ton	53	0	0	to	55	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	14	0	0	to	14	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to		—	
Sulphate	ton	105	0	0	to	110	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel ammonium sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	2	2	to	0	2	3
Potassium Carbonate, 90%	ton	115	0	0	to	120	0	0
Chloride	ton	Nominal.						
Chlorate	lb.	0	0	10	to	0	0	10½
Meta-bisulphite, 50-52%	ton	270	0	0	to	280	0	0
Nitrate, refined	ton	70	0	0	to	72	0	0
Permanganate	lb.	0	5	3	to	0	6	6
Prussiate, red	lb.	0	5	3	to	0	5	6
Prussiate, yellow	lb.	0	2	3	to	0	2	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	15	0	to		—	
Seconds	cwt.	6	0	0	to		—	
Sodium acetate	ton	61	0	0	to	63	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	9	to	11	0	0
Bichromate	lb.	0	1	11	to	0	2	0
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0

	per	£	s.	d.		£	s.	d.
Sodium Chlorate	lb.	0	0	5½	to	0	0	6½
Caustic, 70%	ton	42	0	0	to	44	0	0
Caustic, 76%	ton	46	0	0	to	47	0	0
Hydrosulphite, powder, 85%	lb.	0	4	0	to	0	5	0
Hyposulphite, commercial	ton	37	10	0	to	40	0	0
Nitrite, 96-98%	ton	100	0	0	to	105	0	0
Phosphate, crystal	ton	42	0	0	to	44	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	5½	to	0	1	6½
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	62	10	0	to	65	0	0
Sulphite, cryst.	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	24	0	0	to	26	0	0
Roll	ton	24	0	0	to	26	0	0
Tartar emetic	lb.	0	3	4	to	0	3	5
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	72	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	6	to	0	5	9
Alphanaphthylamine	lb.	0	4	0	to	0	4	3
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	13	6	to	0	14	
Benzidine, sulphate	lb.	0	10	6	to	0	11	6
Benzoic, acid	lb.	0	5	6	to	0	6	0
Benzoate of soda	lb.	0	5	6	to	0	6	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	5	6	to	0	5	9
Betanaphthylamine, technical	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	4	to	0	1	6
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	3	to	0	2	6
Dimethylaniline	lb.	0	5	0	to	0	5	6
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	6	to	0	15	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	3	to	0	1	4
Nitrotoluol	lb.	0	1	4	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	2	to	0	1	4
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	7	to	0	1	8
Para-amidophenol, base	lb.	0	15	0	to	0	16	0
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	6
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	6	to	0	9	0
Paranitrophenol	lb.	0	2	6	to	0	2	9
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	6	to	0	9	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salol	lb.	0	5	9	to	0	6	6
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	5	to	0	1	6
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Companies Winding Up Voluntarily

SOUTH WALES (SIEMEN'S PATENT) GLASS MANUFACTURING CO., LTD.—A meeting of creditors will be held at the offices of John Wood & Son, Incorporated Accountants, 179, Dock Street, Newport, Mon., on Friday, July 30, at 12 noon. H. Wood, Liquidator.

BROUGHTON DYE MANUFACTORY, LTD. (In voluntary liquidation).—A general meeting of members will be held at 105, Market Street, Manchester, on Wednesday, August 25, at 3 p.m. A. Thwaites, Liquidator.

Notice of Dividend

RING, HAROLD (trading as Harold Ring & Co.), Oakleigh, Western Road, Flixton, Cheshire, and carrying on business at 5, Cheapside, Manchester, chemical merchant. 7s. 2d. first and final. July 23, Official Receiver's Offices, Byrom Street, Manchester.

Bill of Sale

[The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of 1882 and under the Act of 1878. Both kinds require re-registration every five years. Up to the date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.]

DAVY, CLEMENT WALTER, The Gordon Boathouse, Railshead Ferry, Isleworth, manager to a powder and chemicals company. Filed, July 14, £400.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]*

BENZOL & BY-PRODUCTS, LTD., London, E.C.—Registered July 7, £40,000 mortgage, to Crigglestone Collieries, Ltd., near Wakefield; charged on lands and minerals of the company at and near Crigglestone.

Satisfaction

ALUMINIUM CORPORATION, LTD., London, E.C.—Satisfaction registered July 9, £50,000, registered July 9, 1919.

BRITISH CELLULOSE & CHEMICAL MANUFACTURING CO., LTD., London, S.W.—Satisfaction registered July 9, £120,000, being the total amount issued of £130,000, registered November 26, 1916.

W. J. BUSH & CO.—For the year ended December 31 last there is a net profit of £96,828, which, with the amount brought forward, makes a total of £115,776. After deducting amount for dividends on the preference shares, there remains a balance of £109,526. The directors recommend a final dividend of 10 per cent. on 250,000 ordinary shares, making, with the interim dividend already paid, £31,250; to reserve fund, £30,000; writing down goodwill, £10,115; carry forward (out of which will be paid the excess profits duty for 1919), £38,161. The addition of the £30,000 allocated as above, to the amount shown in the balance-sheet, increases the general reserve fund to £210,000. In March last it was decided to capitalise £125,000 by the creation of 125,000 new ordinary shares. The amount of the general reserve fund to carry to the next balance-sheet will, therefore, be £85,000. An interim dividend of 5 per cent. was paid on the original ordinary share capital of £125,000 in January of this year. The final dividend of 10 per cent., referred to above, will be paid on the increased amount, namely, £250,000.

Company News

UNITED DRUG CO.—A quarterly dividend has been declared of 87½ cents. on the first preferred, and 1½ per cent. on the second preferred stock.

CANADA CEMENT.—A quarterly dividend has been declared of 1½ per cent. ($1½ per share), less tax, on common stock, payable on July 16. Last year the dividend was the same.

GAS LIGHT & COKE.—The following dividends have been declared for the half-year ended June 30: at the rate of £2 12s. 6d. per cent. per annum on 3½ per cent. maximum stock and at the rate of £3 per cent. per annum on the ordinary stock.

CAPE ASBESTOS CO.—The accounts for 1919, after making provision for excess profits duty, income tax, &c., and including income from Capamianto, S.A.I., Turin, show a profit of £20,428, making, with £6,074 brought in, an available profit of £26,503, compared with £19,325. The sum of £5,000 is placed to reserve, making that fund £40,000. Dividend on ordinary shares, 10 per cent. (against 6 per cent.); £10,010 forward.

PACIFIC PHOSPHATE CO.—At an extraordinary general meeting held in London last week, a resolution was passed providing for the payment of the sum of £150,000 by way of compensation and bonus to the directors, managing directors, and such members of the staff as the board should decide, out of the sum of £3,500,000, the proceeds of a sale of the company's rights and interests in, and connected with Naura and Ocean Islands.

NEUCHATEL ASPHALTE.—The profit for the year 1919, after providing for depreciation and for reserves for maintenance of streets, amounted to £39,932, to which has to be added the balance of £4,859 brought forward, making a total of £44,791. Preference dividends for the year, amounting to £10,000, were paid, and a sum of £30,148, balance of exchange account, has to be deducted, leaving a balance to the credit of profit and loss of £4,643, which it is proposed to carry forward.

MOND NICKEL.—£531,295, the balance to credit of the profit and loss account, the directors propose to deal with as follows: dividends on preference capital at 7 per cent. per annum, subject to deduction of income-tax, £175,000; interim dividend on the ordinary capital of 1s. per share paid February 5, 1920, free of tax, £45,000; dividend now to be paid on the ordinary capital of 2s. 6d. per share, free of tax, £112,500; income-tax, £84,000; balance forward, £114,795.

DUCKTOWN SULPHUR, COPPER & IRON.—Presiding at the 30th general meeting in London last week, Mr. J. G. Gordon (chairman and managing director) said the acid plant was working with excellent results. The present weekly production of about 1,000 tons of 60° acid was better than had ever before been achieved regularly, and the cost of production, which was $4.50 per ton, against about $6.50 last year, would be still lower but for the higher cost of everything they used. However, they were making a profit of about $3 per ton, against a loss last year. The prospect with regard to the sulphuric acid department was certainly good, and the copper producing department should also give good results.

ANGELA NITRATE.—Mr. H. W. Morrison, who presided at the annual meeting last week, called attention to the fact that although their raw material constituted their capital, the Inland Revenue authorities, in assessing them for income tax, allowed no reduction for the exhaustion thereof, and that, consequently, they were taxed on capital as well as income. So far, this company, in common with most other nitrate companies, had not been liable for excess profits duty, but in view of the good sales made by the Nitrate Association for 1920, it would appear that English nitrate companies were likely to have to pay this tax. The question that would then confront the boards of English nitrate companies would be whether, having regard to the wasting nature of their assets, it would not be their duty to the shareholders to curtail their production to such a point as to avoid liability for the tax, and prolong the life of their grounds by not using up raw material, which, he repeated, was their capital. The incidence of income tax and excess profits duty on English nitrate companies was a very serious matter, and it ought to be considered by the Inland Revenue, as, otherwise, there was a great danger of companies changing their domicile to Chile. Already one very important company had been forced to do this, and there was considerable agitation going on for others to follow suit.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C. :—

ALLIANCE GLASS WORKS, LTD., 3 Howard Street, W.C.2—Manufacturers of glass. Nominal Capital, £25,000 in 22,000 10 per cent. cumulative preference shares of £1, and 60,000 ordinary shares of 1s. each. Minimum subscription, £7. Directors: J. E. Haig, A. Reid, W. Lawson, and W. J. M. Martin. Qualification of directors, £100. Remuneration of directors, £150 each.

BRITISH DOMINION CHEMICAL & DRUG CO., LTD., 24, Queen Victoria Street, E.C. 2.—Druggists and chemists. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: E. Crisp and T. G. Pickering. Qualification of directors, 100 shares.

COOPER & COOPER CHEMICAL CO., LTD.—Manufacturers of chemical goods, druggists, drysalters, &c. Nominal Capital, £3,000 in 3,000 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, one share. Subscribers, G. E. Davis and A. O. Warren.

CRITCHLEY, C. A. & CO., LTD., 10, King William Street, Blackburn, chemists and druggists. Nominal Capital, £10,000 in 10,000 shares of £1 each. Directors: C. A. Critchley and J. Fairbairn. Qualification of directors, 200 shares.

HILL BROTHERS (MANUFACTURING), LTD., 5, Fenchurch Street, E.C.—Manufacturing chemists, &c. Nominal capital, £3,000 in 12,000 shares of 5s. each. Directors: E. G. Hill, and F. T. L. Prinsep. Remuneration of directors, £25 each.

M. B. LABORATORIES, LTD.—Manufacturing chemists and druggists. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: J. Menzies and F. Beard. Qualification of directors, £10.

MAGNESIUM CO., LTD.—To carry on the business of chemical manufacturers. Nominal capital, £75,000 in 75,000 shares of £1 each. Directors: P. St. Clair Matthey, R. P. Sellon, E. Caillard, A. H. Barker, E. A. Ashcroft. Qualification of directors, 1 share. Subscribers, G. Reader and W. A. Chadwick.

METALS (P. R.), LTD., 616 and 8, Old Bond Street, W.—Metal refiners and metallurgists, &c. Nominal Capital, £1,000 in 900 6 per cent. preference shares and 100 ordinary shares of £1 each.

WARNER, (A.) & SON, LTD., 95, Cannon Street, E.C.—Manufacturers of fertilisers. Nominal capital, £1,000 in 1,000 ordinary shares of £1 each. Directors: J. F. Drake, J. Gordon, and A. Warner. Qualification of directors, one share.

Asbestos Cement for China

OWING to the scarcity and very high cost of building materials in China there is a big demand for some such material as asbestos cement, and it is stated that if manufacturers of this article would market it in China they should meet with instantaneous success. An immediate opportunity would be given them to demonstrate the value of asbestos cement in the Chinese climate.

Benn Brothers Journals

Some Features of the Current Issues

AERONAUTICS.

Third Show Number: "The Aerial Derby"; "A New Theory of the Screw Propeller," by U. A. S. Riach, F.Ae.S.

THE CABINET MAKER.

"The Study of Tone Values in Furnishing"; "Practical Polishing"; "Six-Legged Tables."

THE ELECTRICIAN.

"Electric Winding Engines and Mine Hoists," by H. H. Broughton; The Summer Visit to the Western Centre of the Institution of Electrical Engineers; and "The Evolution of the Coolidge Tube," Address by Dr. W. D. Coolidge to the Röntgen Society.

THE FRUIT-GROWER.

"Motor Vehicles for Fruit Industry"; "Fair Trading Council Formed"; and "Fuel Research Boards' Report."

THE GAS WORLD.

Dr. Charles Carpenter on "Co-Partnership and Trade Unionism"; "Distribution of Gas by Steel," by B. R. Parkinson; and "Progress of the Gas Regulation Bill."

THE HARDWARE TRADE JOURNAL.

"A Note on the Enamelling of Cast Iron"; "The Elusive Order"; and "A Trade in Tools."

WAYS AND MEANS.

"Profit-Sharing in the United Kingdom," by William Wallace; "Rhodesian Natives and the Land," by John H. Harris; and "The Fuel of the Future," by L. Brook-Partridge.

Carbon Monoxide in Mine Air

A CONVENIENT and portable apparatus for the estimation of small quantities of carbon monoxide in the air of mines has been devised by Mr. J. I. Graham, research chemist, Bentley Collieries, Doncaster. The apparatus consists of a vessel containing a known volume of the sample, which can be introduced by running water out of the vessel. By operating a three-way tap and blowing water into the vessel the sample may be passed into iodine pentoxide contained in a U-tube, heated to 90°-150°C. In examining air in the mine the temperature is maintained by hot oil contained in a thermos flask which keeps the U-tube within these limits for several hours. The iodine liberated from the pentoxide is thus sublimed and driven into a tube containing a solution of potassium iodide in which the free iodine can be titrated and estimated in the usual way. The inventor claims that an analysis can be completed in about five minutes with an accuracy of 0·005 per cent. using 100 c.c. of air, or of 0·0005 per cent. with 1 litre. It is of special value for estimating small quantities of carbon monoxide in mine-air, since 0·2 per cent. is highly dangerous, and even 0·02 per cent. produces after a time unpleasant effects. As the quality of compressed oxygen supplied in cylinders is important in life-saving operations in mines Mr. Graham has introduced a simple piece of apparatus for determining the amount of oxygen by absorbing a known volume in alkaline pyrogallol.

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